WESTERN POWER DISTRIBUTION

INNOVATION

NEXT GENERATION NETWORKS

Marketing and PR Report
October 2017
Electric Nation

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Glossary

Abbreviation	Term
EV	Electric vehicle
PR	Public relations
WPD	Western Power Distribution

This report provides a comprehensive overview of all marketing and public relations (PR) activity that has taken place for the Electric Nation project (the Project) from August to October 2017. EA Technology manages all aspects of marketing and PR for the Project on behalf of Western Power Distribution (WPD) and its project partners and suppliers. Automotive Comms delivers strategic direction and all associated marketing and PR services for the Electric Nation project.

1.1 Electric Nation

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

Electric Nation, the world's largest electric vehicle (EV) trial, is revolutionising domestic plug-in vehicle charging. By engaging 500-700 plug-in vehicle drivers in trials, the project is answering the challenge that when local electricity networks have 40% - 70% of households with electric vehicles, at least 32% of these networks across Britain will require intervention.

The project is developing and delivering a number of smart charge solutions to support plug-in vehicle uptake on local electricity networks. A key outcome will be a tool that analyses plug-in vehicle related stress issues on networks and identifies the best economic solution. This 'sliding scale' of interventions will range from doing nothing to smart demand control, from taking energy from vehicles and putting it back into the grid, to traditional reinforcement of the local electricity network where there is no viable smart solution.

The development of the project deliverables is being informed by a large-scale trial involving plug-in vehicle drivers that will:

- Expand current understanding of the demand impact of charging at home on electricity distribution networks of a diverse range of plug-in electric vehicles - with charge rates of up to 7kW+, and a range of battery sizes from 20kWh to 80kWh+.
- Build a better understanding of how vehicle usage affects charging behaviour.
- Evaluate the reliability and acceptability to EV owners 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?

The results of this project will be of interest and will be communicated to the GB energy/utility community, UK government, the automotive and plug-in vehicle infrastructure industry and the general public.

2.1 Recruitment

A key aim of marketing and PR under the Electric Nation project is to demonstrably support DriveElectric's customer recruitment goals to achieve 500-700 WPD customers recruited into the project trials by December 2017. To this end, weekly project management telephone calls are organised and facilitated by EA Technology between itself, Automotive Comms and DriveElectric to ensure that the marketing activity is providing the recruitment campaign with the tools that it needs in order to boost and maintain customer engagement in the project. WPD is invited onto these calls on an ad hoc basis to keep the WPD team informed, engaged and updated as required.

2.2 Dissemination

Formal reporting and dissemination of information and results, being technical where appropriate, is required to relevant government-related organisations such as Ofgem, OLEV, BEIS and DfT, as well as the utilities (including all GB distribution network operators, energy suppliers and generators), energy industry and consultants. The main message to these stakeholders is focused on progress and results of the trial, and technical measures that can be adopted around electric vehicle demand management, and potentially vehicle to grid technologies.

More general and less technical cross-sector and customer dissemination of information and results will be directed to Government, public sector, academic and professional bodies and institutions, and to the general public to an extent.

The marketing and PR strategy underpins all communications and dissemination activity for Electric Nation. It establishes a uniform approach to describing the project, its funding mechanism and key collaboration partners, together with both a long and short summary for the project (Appendix 1), as well as the key communication messages for use by all project partners and suppliers.

3.1 Key recommendations

The strategy identified the need to intercept buyers of plug-in vehicles before orders for vehicles and charge points are placed. These customers must live in WPD's area of the South West, South Wales, and Midlands; a map and postcode checker have been developed and used in the maximum amount of communication and housed on the Project's website. The strategy also identified the following:

- DriveElectric to encourage people taking out new plug-in leases to take part
- Need to encourage manufacturers, and critically their dealers, to promote the project
- Wider marketing, communication and PR, ultimately targeting all people who may be considering buying a plug-in vehicle in the near future

Managing expectations is critical to Electric Nation; there may be people who are keen to take part but who may not be able to do so due to a number of reasons, such as:

- They are outside of the initial areas
- Their property may not be suitable to have a charging point installed
- They may have to wait too long to acquire a vehicle
- All places for their vehicle technology may be already filled

Therefore, the Project is careful to manage expectations in all its communication; all communications materials stresses phrases such as "subject to eligibility and availability".

Trial participants and conduits to engagement / recruitment are:

- Potential trial participants, i.e. primarily prospective plug-in vehicle buyers
- DriveElectric customers
- Plug-in vehicle manufacturers and their dealers
- The Go Ultra Low Cities of Milton Keynes, Bristol and Nottingham / Derby through the relevant delivery organisations and Councils
- Low carbon/low emission automotive organisations (e.g. LowCVP)
- EV charge point/equipment suppliers and installers, particularly those companies contracted by DriveElectric to install the smart chargers under the Project
- Other automotive industry organisations (e.g. SMMT)

The strategy identified the need to intercept buyers of plug-in vehicles before orders for vehicles and charge points are placed.

In this period, trial recruitment has gone exceptionally well, with over 410 trial participants now recruited into the trials. DriveElectric is confident that recruitment targets (700) will be met in January 2018; the pipeline of interest in the trials is such that the project website has been amended to make it clear that from now on, registrations of interest will result in being

offered a place on the reserve list. This manages customer expectations, whilst also allowing any future attrition from the project trials to be managed, reducing risk of under achieving on trial participant numbers. The homepage has been revised accordingly, as well as the message that appears on all enquiry forms (Appendix 2).

EA Technology is developing a positive and ongoing relationship with the Office for Low Emission Vehicles, which is supportive of Electric Nation, with smart charging being on the UK Government policy's agenda under the new Automated and Electric Vehicle Bill. EA Technology and WPD met with the Head of OLEV on 4 October 2017 to provide an in-depth update on Electric Nation.

As the project moves further into the demand management phase with its customers, management of trial participants' expectations continues to be critical. EA Technology is supporting DriveElectric's engagement with trial participants through provision of timely and appropriate letters and email communications, and through keeping a close watch on the project's Twitter activity. Any suggestion of smart charger issues raised on Twitter are directed immediately to DriveElectric, to ensure swift and due process is followed to manage resolution of the issue. There was one such issue raised on Twitter in this reporting period; a trial participant saying that their charger was not working. This was picked up within one minute of going out on Twitter, and responded to within the same timescale, with both DriveElectric, and EA Technology's technical lead on the project, being alerted in parallel. The issue was resolved within four hours, to the satisfaction of the customer trial participant.

During this period, activity has been geared towards:

- Supporting trial recruitment: maintaining and increasing momentum in both registrations of interest ('leads') and securing commitment to taking part in the trial, evidenced through numbers of smart charger installations completed
- Planning for managing customer expectations as the trial recruitment winds down
- Dissemination of early learning: key learning from the Algorithm Development and Testing Report has been disseminated at conferences and events in this period, notably at Cenex LCV 2017
- Introduction of the Network Assessment Tool (NAT): dissemination of the detail and work to date on the NAT at WPD's Balancing Act event

4.1 Supporting trial recruitment

Table 4.1 summarises the marketing and PR activity that took place between August - October 2017 in support of customer recruitment into the project's EV demand management trials.

Table 4.1: Marketing and PR activity August - October 2017: Supporting trial recruitment

Item	Detail	Appendix
Press release	5 September 2017	Appendix 3
News items	On project website – project news	Appendix 4
News items	On project website – EV industry news	Appendix 5

4.2 Dissemination

EA Technology has attended a number of relevant industry events to raise the profile of the Electric Nation project and to share early learning arising from Algorithm Development and Testing Report. It is also incumbent on a project of this nature to raise awareness of its existence amongst the industry to guard against project duplication. Table 4.2 details the events attended at which EA Technology and WPD has presented on the project, the audience composition and estimated audience numbers, together with coverage in publications to disseminate project learning.

Table 4.2: Marketing and PR August – October 2017: Dissemination

Item	Detail	Appendix
Balancing Act 5 October	Dissemination of trial recruitment news and demand management early learning, and introduction of the Network Assessment Tool to cross-industry and DNO audience	Appendix 6
Electric Vehicle Charging Point Infrastructure Conference, Nottingham 4 October	WPD attended as a speaker and expert panellist to provide project insight into smart charging / demand management	
Cenex LCV 2017 6-7 September 2017	Dissemination of learning to the low carbon vehicle sector and charging point supply chain	Appendix 7

Planning went well for Electric Nation's presence at Cenex LCV 2017, a key event in the project's diary for mass dissemination of learning and raising project profile to the low carbon vehicle industry. Arrangements were made in two respects:

- Production of a joint exhibition stand with WPD, and Electric Nation partners and suppliers; and
- Speaking slot at the event to disseminate early learning on EV demand management and progress towards securing suitable vehicle to grid units for integration into the customer trials.

Electric Nation exhibited at the event which took place at Millbrook in Bedfordshire on 6-7 September, supported by the majority of project partners and suppliers. The stand was busy throughout and resulted in 90 leads being captured; interest ranging from smart charging and trial set up to early results and customer acceptance of smart charging. WPD and EA Technology presented at the event to an engaged audience; the 'funnel diagram' (Figure 4.1) showing spare capacity for managed charging was well received.

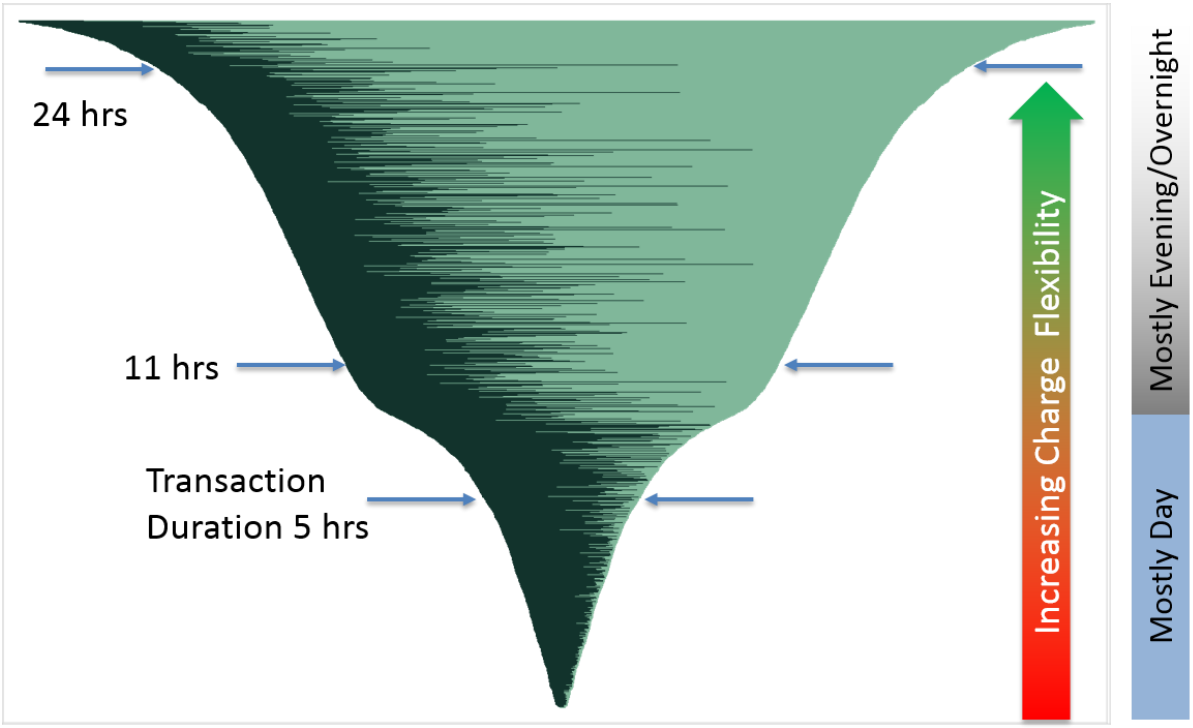

Figure 4.1: Electric Nation funnel diagram demonstrating spare charging capacity

Figure 4.2: Electric Nation partners and suppliers on the project stand at Cenex LCV 2017

The Electric Nation demand management model was very well received at the event, leading to project partners suggestions that a video should be made of it, demonstrating how it works, for widespread use at both national and international events.

Figure 4.3: Electric Nation demand management model at Cenex LCV 2017

4.3 Social media

Social media is recognised as a key tool to support both trial participant recruitment activity and dissemination in the Electric Nation project. All project-related social media activity is supported by a WPD approved Social Media Policy, which has been circulated to all project partners and suppliers.

4.3.1 Twitter

Responsibility for managing the Twitter account is split between EA Technology and DriveElectric. This approach maintains the delineation between DriveElectric and its customer interface role, and EA Technology, which must have no direct communication with customers, as per the project's Customer Engagement Plan.

EA Technology is responsible for:

- Maintaining a pipeline of relevant EV-industry related news tweets (and retweets)
- Tweeting news directly linked to the Electric Nation Twitter account
- Tweeting Electric Nation project updates to support learning dissemination activities on behalf of the project and its partners / suppliers

DriveElectric is responsible for:

- All customer interaction and communications through the Electric Nation Twitter account. This includes responding to all queries, complaints and comments in general in a timely manner
- Monitoring the Electric Nation Twitter account on a daily basis to enable timely responses, and to manage unwanted contacts
- Scheduling daily / bi-daily tweets to support recruitment activities
- Tweeting about Electric Nation EV test drive events and related recruitment activities

The Electric Nation Twitter account (@ElectricNation_) was launched at LCV 2016 to align with the official launch of the project and its recruitment activity. To date, the Electric Nation Twitter account has 1,165 followers, an increase of 78% since the last reporting period. The account has delivered 686 tweets, a 67% increase since last reporting period and achieves a good level of retweet activity, including regular retweets by WPD, the Office for Low Emission Vehicles, and project partners and suppliers.

Table 4.3: Twitter activity increase from last reporting period

Item	Last reporting period	Current reporting period	% increase
Twitter Followers	918	1,165	78%
Tweets	459	686	67%

The project has capitalised on the Electric Nation Tesla touring round the UK and in particular the WPD licence areas in September – October, by delivering an #ispyEV Twitter campaign, inviting followers to guess where the Tesla is located (accompanied by photographs of the Tesla in various locations).

Figure 4.4: Electric Nation Tesla image tweeted as part of the #ispyEV campaign

4.3.2 LinkedIn

Managed by EA Technology, Electric Nation has a LinkedIn Group that currently has 44 members from across automotive / energy / DNO stakeholder groups. It is used on a relatively infrequent basis to deliver news items and event details at which the project and its partners will be appearing. The Group will become more active once the project starts to deliver trial results and learning.

4.3.3 Facebook

Electric Nation has a Facebook page that is customer-facing and is therefore managed by DriveElectric, albeit its set up was supported by Automotive Comms to ensure branding and message were in line with strategy. Progress on this front will be reported under separate cover by DriveElectric.

4.4 PR report

In this reporting period one press release has been issued (nine in total since project inception). A selection of the coverage may be found below.

5 September 2017
Research shows that smart charging can be key solution to challenge of network demand from EVs

https://www.cleanenergynews.co.uk/news/transport/smart-charging-shown-to-be-a-key-solution-to-challenge-of-electric-vehicle
https://www.greenfleet.net/news/05092017/smart-charging-key-managing-ev-grid-demand-trial-shows
https://www.carkeys.co.uk/news/smart-car-charging-can-prevent-power-grid-overload
https://www.contracthireandleasing.com/car-leasing-news/is-smart-charging-the-solution-to-ev-demands-on-the-electricity-grid/
https://www.transportxtra.com/publications/local-transport-today/news/54719/smarter-charging-could-meet-demand-for-electric-vehicle-charging-reports-electric-nation

Each press release, where there is an automotive angle, is issued via Newspress: http://www.newspress.co.uk/public/Login.aspx. Newspress reaches more than 3,000 accredited, approved journalist users. The releases are also issued through Cision PR software (http://www.cision.co.uk), a media software tool that reaches a targeted 200 motoring media out of over 5,000 on the database, including around 50 energy media out of a similar total number - both include trade titles and national media. Finally, Automotive Comms has built up a list of over 200 industry media contacts, covering relevant local and national media.

In this reporting period eight news items have been uploaded to the Electric Nation news section on the website:

11 October:	ELECTRIC NATION AT WPD'S BALANCING ACT CONFERENCE
13 September:	THE TOP 10 ELECTRIC CAR NEWS STORIES FROM THE 2017 FRANKFURT MOTOR SHOW
12 September:	ELECTRIFYING THE UK AUTOMOTIVE INDUSTRY: LCV2017 REVIEW
5 September:	RESEARCH SHOWS THAT SMART CHARGING CAN BE KEY SOLUTION TO CHALLENGE OF NETWORK DEMAND FROM EVS
1 September:	NEW WLTP & RDE ECONOMY & EMISSIONS TEST START TODAY
16 August:	VISIT ELECTRIC NATION AT LCV2017
10 August 2017:	BMW i3 94Ah BMW ELECTRIC VEHICLE SALES INCREASE BY 75%
7 August:	THE FUTURE OF LOW CARBON TRANSPORT: CENEX-LCV2017 SEMINARS ANNOUNCED

All press releases and news items are uploaded to the Electric Nation website and shared extensively via @ElectricNation_.

In response to the Energy UK EV Revolution report published in September, Electric Nation is defining the need for managed / smart charging in an article in Energy World magazine, due to be published in October (not available at time of writing). WPD and EA Technology have also been interviewed for a piece in Autocar, which should be published end of October / early November.

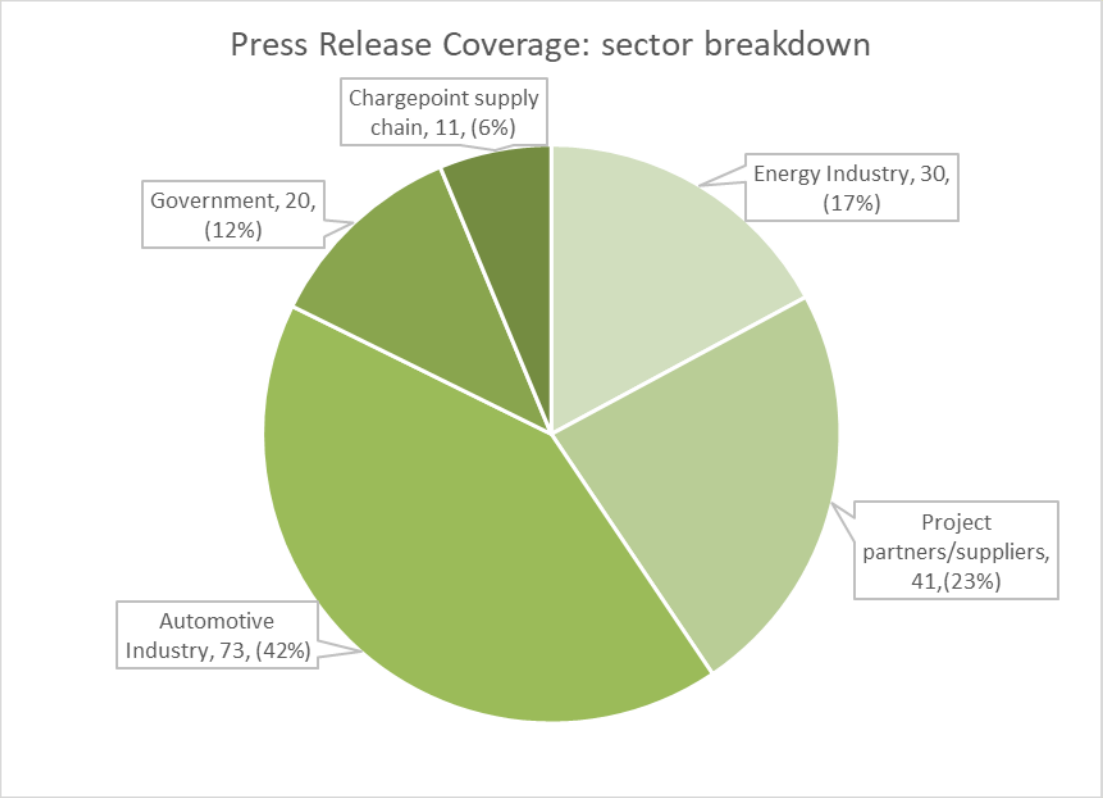

Figure 4.5: Press release coverage: sector breakdown

The breakdown of coverage by sector in Figure 4.5 shows that 42% is by automotive publications, with 23% by project partners and suppliers; both down from almost a half and a third respectively, in the last reporting period. Energy sector coverage has increased by 2%, to 17%.

It has been an aim of the marketing and PR strategy from the outset to encourage uptake and dissemination of press releases by the collaboration partners and suppliers, and to engage effectively with the automotive sector to raise awareness of the challenge of EVs connecting to local electricity distribution networks, and the demand management solutions being trialled through Electric Nation. The press release coverage breakdown indicates that the project is effectively reaching out to these stakeholders.

Coverage from Government has increased significantly from just 5% in the last reporting period to 12%. This is encouraging, given the prescience of smart charging in political terms. The charging point supply chain accounts for 6%, offering just a 1% increase from the last reporting period. Government coverage encompasses both local and central Government, notably the Go Ultra Low cities of Nottingham, Bristol and Milton Keynes.

4.5 Next steps

The Project team at EA Technology will continue to work alongside project partners to ensure that all marketing and PR activity supports partners to achieve their deliverables. Trial recruitment will come to a close, with communications going to all engaged EV dealers and other parties who have been active in helping to promote the project to prospective trial participants.

It is anticipated that a short film will be produced in the next reporting period, to demonstrate demand management and V2G using the Electric Nation model.

Electric Nation will present at the 2017 UN Climate Change Conference (COP23), 9-10 November in Bonn, using the smart charging model to demonstrate EV demand management and V2G.

A dissemination highlight in the next reporting period will be the Low Carbon Networks Innovation Conference (LCNI), taking place in Telford on the 6 to 7 December. LCNI presents an ideal opportunity at which to disseminate early learning and continue to raise the profile of the Project, of smart charging, and of the Network Assessment Tool. Electric Nation will exhibit on WPD's stand and has a speaking slot with WPD on the second day of the show.

Appendix 1 – Project description and summaries from Marketing and PR Strategy

Uniform project description – to be included in all project communications

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.

Long summary

The Electric Nation project will develop and deliver a number of smart charge solutions to support plug-in vehicle uptake on local electricity networks. A key outcome will be a tool that analyses plug-in vehicle related stress issues on networks and identifies the best economic solution. This 'sliding scale' of interventions will range from doing nothing to smart demand control, from taking energy from vehicles and putting it back into the grid, to traditional reinforcement of the local electricity network where there is no viable smart solution.

The development of the project deliverables will be informed by a large-scale trial involving plug-in vehicle drivers that will:
1. Expand current understanding of the demand impact of charging at home on electricity distribution networks of a diverse range of plug-in electric vehicles - with charge rates of up to 7kW+, and a range of battery sizes from 20kWh to 80kWh+.
2. Build a better understanding of how vehicle usage affects charging behaviour.
3. Evaluate the reliability and acceptability to customers of controlling the demand for electricity/taking energy from vehicles and putting it back into the grid.

The results of this project will be of interest and will be communicated to the GB energy/utility community, to UK government, to the automotive and plug-in vehicle infrastructure industry and to the general public.

Short summary

Electric Nation, the world's largest EV trial, is revolutionising domestic plug-in vehicle charging. By engaging up to 500-700 [1]plug-in vehicle drivers in trials, the project is answering the challenge that when local electricity networks have 40% - 70% of households with electric vehicles, at least 32% of these networks across Britain will require intervention. Electric Nation is pioneering our electric future.

[1] Updated from '500' in the first strategy draft, June 2016, to '500-700' in a marketing strategy update session, October 2016.

Appendix 2 – Amendment to website text

Electric Nation Website – New Text, 10 Oct 17 v2

Home page

http://www.electricnation.org.uk

BE PART OF THE ELECTRIC NATION COMMUNITY

Change to:

ELECTRIC NATION IS ON TRACK TO ACHIEVE ITS TARGET OF 700 TRIAL PARTICIPANTS.
APPLICATIONS WILL NOW GO ON A RESERVE LIST.

(CURRENT TEXT):

APPLY TO TAKE PART
Electric Nation is seeking to recruit 500-700 people buying or leasing new electric vehicles (including pure electric and plug-in hybrids) to take part in a trial to ensure the UK can charge electric vehicles at peak times as the numbers of EVs rise.

For the first six months of the project (at least) the trial will only take place in certain geographical locations: the WPD network areas in the South West, South Wales, West & East Midlands – view the map

After six months the trial may broaden out to the rest of Britain if there are still places free. The free smart charger is only available to people who have not previously taken advantage of the OLEV home charger grant.

Find out more about eligibility and what the trial will involve.

Check your eligibility for the project.

Change to:

ELECTRIC NATION IS ON TRACK TO ACHIEVE ITS TARGET OF 700 TRIAL PARTICIPANTS.
APPLICATIONS WILL NOW GO ON A RESERVE LIST.

Electric Nation is on track to achieve its target of recruiting 700 people buying or leasing new electric vehicles (including pure electric and plug-in hybrids) to take part in a trial to ensure the UK can charge electric vehicles at peak times as the numbers of EVs rise.

The trial is only taking place in certain geographical locations: the WPD network areas in the South West, South Wales, West & East Midlands – view the map

The free smart charger is only available to people who have not previously taken advantage of the OLEV home charger grant.

Applications to take part from now on will go on a reserve list; unfortunately, we cannot guarantee that such applications will be processed or responded to.

Find out more about eligibility and what the trial will involve.

Check your eligibility for the project.

> Postcode Checker

Message to appear in response to all enquiry forms:

Thank you for your interest in Electric Nation. We are delighted to announce that the project is on track to achieve 700 trial participants - five months ahead of schedule. Applications to take part from now on will go on a reserve list; unfortunately, we cannot guarantee that such applications will be processed or responded to.

Appendix 3 – Press Release 5th September 2017

Press Release

From Electric Nation

5 September 2017

Research shows that smart charging can be key solution to challenge of network demand from EVs

• Initial findings of Electric Nation trial suggest that smart charging can be a key solution to the impact of increasing numbers of EVs on the electricity network

• Vehicle to grid charging – soon to be trialled as part of the Electric Nation project - will provide further help

• The main issue around grid capacity relates to clusters of EVs charging on local electricity networks at peak times

The Electric Nation project is due to announce its initial findings on the first day of the Cenex Low Carbon Vehicle event (LCV2017), held at Millbrook on 6-7 September 2017, which will show that smart charging can provide a key solution to the challenge of the demand from increasing numbers of electric vehicles (EVs) on electricity networks.

Recent reports in response to the government's announcement about the ban of petrol and diesel cars by 2040 have raised concerns about the ability of the UK's electricity networks to provide sufficient power for increasing numbers of EVs.

National Grid's 'Future Energy Scenarios' (FES) included a number of scenarios which estimated the additional system-wide peak electricity demand from electric vehicles would range from 6 to 18GW in 2050. A lower increase (6 GW) is predicted when the use of smart charging and time of use tariffs is widespread. Further reductions in peak electricity demand are also likely to be possible by vehicle to grid charging (V2G); Electric Nation will be incorporating V2G trials into the project.

Electric Nation is investigating the benefits which smart charging could provide for local electricity networks, where additional demand from local clusters of EVs could require reinforcement of these networks.

Electric Nation's initial findings to be presented at LCV2017 are based on almost 70,000 hours of charging data, and show that 48% of plug-in events begin between 5pm and midnight. On average, these vehicles are plugged in for 12 hours, but are only charging for just over two hours. This suggests that there is likely to be sufficient flexibility to manage charging away from peak electricity demand periods. This will be explored in detail through the smart charging trial taking place during the rest of 2017 and 2018.

Over 40 different makes and models of EVs are taking part in the trial, and the geographical hot spots of EV owners who are taking part will be revealed in Electric Nation's presentation at LCV.

Electric Nation, one of Western Power Distribution's (WPD) innovation projects, with collaboration partners EA Technology, DriveElectric, Lucy Electric GridKey and TRL, is believed to be the world's largest trial of its kind, and is offering a free smart charger to 500-700 electric vehicle drivers.

The project is ahead of schedule with recruitment, having received over 2,500 enquiries, which have translated to over 700 signed expressions of interest, of which over 400 have been approved, and over 350 smart chargers have now been installed.

Mark Dale, Innovation Manager, Western Power Distribution, comments "The UK Government is looking to mandate smart charging, and the Electric Nation project is providing evidence about whether it will work. Research shows that at least 30% of Britain's low voltage networks are likely to require investment by 2050 to charge EVs, costing at least £2.2bn. Our early findings suggest that smart charging could reduce, delay or avoid the need to upgrade or replace these networks."

The Electric Nation trial is taking place in the WPD network areas in the Midlands, South West and South Wales.

Places on the trial are filling up fast, therefore any new EV owners who want one of the latest smart chargers installed free of charge are advised to apply as soon as possible.

For more information and to check eligibility visit www.electricnation.org.uk

Electric Nation can be found at stand number C3 100-101, and Electric Nation's presentation is taking place on day one of the LCV event, Wednesday 6 September, in the Presentation Zone, Hall 2, starting at 2pm.

For more information about LCV2017 visit www.cenex-lcv.co.uk

Twitter @electricnation_

* Subject to eligibility and conditions

Ends

Image caption

Initial findings from the Electric Nation trial suggest that smart charging can be a key solution to the impact of increasing numbers of EVs on the electricity network

Further high resolution images are available.

Interviews

Members of the Electric Nation team are available for interview/expert comment.

Notes to Editors

About Electric Nation

Data shows that across Britain at least 32% of electricity supply cables (312,000 in all) may require intervention when 40% – 70% of customers have electric vehicles. Intervention using smart technology, rather than digging up the roads to install new cables, has been predicted to give an economic saving of more than £2.2 billion by 2050.

The Electric Nation trial aims to:

1) Expand current understanding of the impact on electricity distribution networks of charging a diverse range of plug-in electric vehicles at home.

2) Build a better understanding of how vehicle usage affects charging behaviour given diversity of charging rate and battery size.

3) Evaluate the reliability and acceptability to owners of EVs of demand management services and the influence these have on charging behaviour.

Electric Nation will provide a top-up contribution towards a smart charger in addition to any applicable OLEV electric vehicle home charge scheme. 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.

Electric Nation 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

Western Power Distribution

The host Distribution Network Operator, providing funding through its Network Innovation Allowance, and direction to the project.

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 the charging of a vehicle. 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.

DriveElectric

Responsible for recruiting participants and all customer-facing activity.

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.

In addition, there are a number of supporting collaborators:

CrowdCharge and GreenFlux

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

Impact Research

Conducting customer research.

Alfen and eVolt Charging Equipment

Providing the smart chargers.

About the Electric Nation collaboration partners

Western Power Distribution

Western Power Distribution (WPD) is the distribution network operator for the Midlands, South West England and South Wales, and is responsible for delivering electricity to approximately 7.8 million customers in the UK. WPD is not an electricity supply company and does not bill customers in the UK. Its responsibility is to distribute electricity from the point of generation to homes and businesses.

www.westernpower.co.uk

EA Technology

EA Technology is the recognised UK authority on the impact of electric vehicles (EVs) on the electricity network, and the pioneer of smart solutions to mitigate this impact. EA Technology is an employee-owned organisation offering high-tech instruments, software, electrical services and technical consultancy to the operators of power networks around the world. Through its Smart Interventions business it delivers innovative end-to-end solutions to facilitate the introduction of low carbon technologies to future proof electricity networks, resulting in lower cost connections, prompt adoption and reduced risk to business.

www.eatechnology.com

DriveElectric

DriveElectric is a trading name of Fleetdrive Management Ltd. Established in 1995, the company based in Marlow, Buckinghamshire has been the UK's leading provider of leased ultra-low emission vehicles since 2011. Providing both business and personal vehicle leasing solutions, for all makes and models of vehicle, DriveElectric delivers expertise, impartial advice and excels in engaging customers in support of a low carbon transport future.

www.drive-electric.co.uk

Lucy Electric GridKey

Lucy Electric GridKey has developed low voltage monitoring systems which are deployed at a large number of sites across the UK as well as a data centre capable of running advanced analytics on the data from the monitoring.

www.gridkey.co.uk

TRL

TRL (the UK's Transport Research Laboratory) provides independent and impartial world-class research and consultancy for all aspects of transport. Commercially independent and with more than 80 years of knowledge and experience embedded in its history, TRL's work encompasses a breadth of areas that shape and form today's transport decisions including safety, highway engineering and maintenance, sustainability, attitudes and behaviours, simulation and modelling, climate change, engineering, product development, standards and specifications.

www.trl.co.uk

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Appendix 4 – Project News

7th July 2017

ELECTRIC VEHICLES AND THE UK'S ABILITY TO CHARGE THEM – COMMENT FROM ELECTRIC NATION

Significant announcements made this week about an accelerated move to electric cars

The UK's local electricity networks can cope with the increase in electric vehicles, but smart 'managed' charging will be required

Electric Nation, the world's largest project of its kind, is trialling a smart charging solution

The last week has seen an explosion of news items about increasing numbers of electric vehicles (EVs), including France banning petrol and diesel cars by 2040, Volvo planning to sell only electric and plug-in hybrid vehicles by 2019, and Tesla announcing that its Model 3 mass-market electric car has started rolling off production lines.

There have been many subsequent articles in the media about whether the UK's electricity grid can cope with increasing numbers of EVs. Electric Nation, a Western Power Distribution (WPD) and Network Innovation Allowance funded project, is trialling a smart charging solution to the potential challenge of clusters of EVs charging at peak times on local electricity networks. WPD's collaboration partners in the project are EA Technology, DriveElectric, Lucy Electric GridKey and TRL.

Mark Dale, Innovation and Low Carbon Networks Engineer at Western Power Distribution (WPD), comments: "While the UK electricity system has plenty of capacity to deliver energy to EVs currently and for the foreseeable future, smart charging can play

an important role in ensuring electricity network upgrades are kept to a minimum as the numbers of EVs being charged at home increase. We believe that with the correct management of charging, the electricity network has the capacity to integrate the predicted uptake of EVs. Smart charging can allow management of the demand on the local electricity network and can help to avoid or defer work to upgrade infrastructure."

Mark was a speaker at this week's 'Powering the Electric and Low Emission Vehicle Future' Policy-UK Forum event. Mark adds that speakers from other organisations at the event, including OLEV, Ofgem, Cenex and the Low Carbon Vehicle Partnership, also provided positive support about the introduction of controllable charge points.

Dave A Roberts, Smart Interventions Director, EA Technology, says: "We are now at a tipping point with the transition to electric vehicles. This is great news for motorists, and the environment, as EVs play a key role in helping to improve local air quality. Smart charging will allow increased uptake of EVs on UK roads and will save money – for the industry and therefore customers – on reinforcing local electricity networks."

The UK Government has ambitious targets for the uptake of EVs, and sales are currently increasing at a rapid rate. An electric vehicle can more than double the demand on the local electricity network from a home when charging at peak times. If many homes in a local area adopt EVs, and they all charge at peak times, then this will have a significant impact on the local electricity network.

The costs to reinforce such local networks – e.g. through replacing cables, overhead lines or substation equipment – has been estimated to be at least £2.2 billion by 2050[1]. However it is expected that such costs can be avoided in many instances by the widespread adoption of smart chargers, which can facilitate managed charging at times of peak demand, as well as providing added functionality for electric car owners.

In order to trial how smart chargers can help address the challenge of increasing number of EVs on local electricity networks, the Electric Nation project is recruiting new EV owners and providing a free* smart charger, so it can learn from the data – and the feedback – from trial participants.

The Electric Nation trial is taking place in the WPD network areas in the Midlands, South West and South Wales. It is seeking to recruit 500-700 people buying or leasing new electric vehicles (of all makes and models, pure electric and plug-in hybrids) to take part in the largest trial of its kind. Trial participants will get a free* smart charger installed.

Places on the trial are now filling up fast, so any new EV owners who want one of the latest smart chargers installed free of charge are advised to apply as soon as possible.

For more information and to check eligibility visit www.electricnation.org.uk

Twitter @electricnation_

* Subject to eligibility and conditions

[1] My Electric Avenue

20 July 2017

SMART CHARGING PROVIDES SOLUTION TO CHALLENGE OF ELECTRIC VEHICLES CREATING EXTRA PEAK ELECTRICITY DEMAND BY 2050

National Grid's 'Future Energy Scenarios' report includes scenario where EVs create an extra 30 per cent peak electricity demand

This challenge can be addressed by smart charging, currently being trialled by the Electric Nation project

Former Mayor of Milton Keynes delighted with free smart charger provided by Electric Nation

Electric vehicles could create an additional peak electricity demand of up to 18 GW by 2050, equivalent to an additional 30 per cent on top of today's peak demand of 60 GW, according to one scenario in National Grid's recently published 'Future Energy Scenarios' (FES).

In all the scenarios bar one, the report predicts a dramatic rise in electric vehicles (EVs), with sales being more than 90 per cent of all cars by 2050.

National Grid has since issued an update saying that the 'Two Degrees scenario' is the more probable, which sees peak demand from electric vehicles alone being around 5 GW, about an 8% increase on today's peak demand value.

Electric Nation, one of Western Power Distribution's (WPD) innovation projects, is trialling a smart charging solution to the potential challenge of EVs charging at home at peak times on local electricity networks. WPD Future Networks Manager, Roger Hey, said "Smarter charging solutions will complement more conventional network upgrades, and allow customers to benefit from a network that is safe, secure, reliable and economical." WPD's own regional energy scenarios predict that as many as two million electric cars will be on the road in the Midlands, South West England and South Wales by 2030.

WPD's collaboration partners in Electric Nation are EA Technology, DriveElectric, Lucy Electric GridKey and TRL. The project is the world's largest trial of its kind, offering a free smart charger to 500-700 electric vehicle drivers.

One such EV driver is Keith McLean, a former Mayor of Milton Keynes. Keith has had his free home smart charger installed since the end of March 2017, and is delighted about being involved in the project. Keith explains: "I signed up to the Electric Nation project because I believed this was an important piece of research to enable the growth in the number of electric vehicles in the UK. The smart charger, which was provided free through the project, has charged my BMW i3 quickly and effectively. There have been a few requirements such as the need to take part in surveys, but these have all been part of the process involved in a trial that is aiming to learn new ways of doing things."

The Electric Nation project provides free smart chargers from suppliers Alfen and eVolt. Alex Earl, UK Country Manager, Alfen, comments: "Alfen-ICU has been involved in a number of smart charging projects in the Netherlands over the past few years, with the broad objectives of minimising charging at peak times in the grid and maximising the use of renewable energy. Projects include reducing charge speeds at peak times, enabling end users to opt to charge based on the availability of locally-produced renewable energy, and having EV charging infrastructure in combination with battery storage and solar PV. We have proven that achieving these objectives is perfectly possible with our tried and tested technology and are very happy to be doing so as part of the Electric Nation project. The increased adoption of EVs doesn't have to create any issues with our electricity grid infrastructure; smart EV charging infrastructure can support remote demand-response technology."

The UK Government has ambitious targets for the uptake of EVs, and sales are currently increasing at a rapid rate. An electric vehicle can more than double the demand on the local electricity network from a home when charging at peak times. If many homes in a local area adopt EVs, and they all charge at peak times, then the local electricity network will need greater capacity and intelligence.

The costs to reinforce such local networks – e.g. through replacing cables, overhead lines or substation equipment – has been estimated to be at least £2.2 billion by 2050[1]. However it is expected that such costs could be reduced by the widespread adoption of smart chargers by customers willing to be flexible about when, or how quickly, their cars are charged.

In order to trial how smart chargers can help address the challenge of increasing number of EVs on local electricity networks, the Electric Nation project is recruiting new EV owners and providing a free* smart charger, so it can learn from the data – and the feedback – from trial participants.

The Electric Nation trial is taking place in the WPD network areas in the Midlands, South West and South Wales. It is seeking to recruit 500-700 people buying or leasing new

electric vehicles (of all makes and models, pure electric and plug-in hybrids) to take part in the largest trial of its kind.

Places on the trial are filling up fast: the project recently achieved the half-way milestone of 250 smart charger installations, and over 2,000 people have expressed interest in joining the project. Therefore any new EV owners who want one of the latest smart chargers installed free of charge are advised to apply as soon as possible.

For more information and to check eligibility visit www.electricnation.org.uk

Twitter @electricnation_

* Subject to eligibility and conditions

[1] Transform Model® analysis of data from My Electric Avenue of the impact of EVs on GB licence areas shows that by 2050 GB DNOs will have to invest £2.2 bn (present day costs) to reinforce low voltage (LV) networks due to increased loads from EV chargers.

16 August 2017

VISIT ELECTRIC NATION AT LCV2017

Electric Nation has a stand at the Cenex Low Carbon Vehicle (LCV2017) event which takes place on 6 & 7 September at Millbrook Proving Ground in Bedfordshire. Mark Dale from Western Power Distribution and Esther Dudek from EA Technology will also be giving a talk about the project, with a focus on presenting the real facts about the need for smart charging as the numbers of EVs in the UK increase.

Electric Nation can be found at stand number C3 100-101, complete with a Tesla hooked up to one of the project's Alfen smart chargers. Come and have a cold drink and chat to us to find out more about smart chargers and the results of the project so far.

Electric Nation's presentation is taking place on day one of the event, Wednesday 6 September, in the Presentation Zone, Hall 2, starting at 2pm. The format of the session is as follows:

Electric Vehicles and Energy Systems: Smart Charging Projects and V2G

14:00-14:10

The convergence of energy and transport: How to navigate the fog and deliver a win-win outcome for all stakeholders

Mark Thompson (Chair), Innovate UK

14:10-14:25

Electric Nation – Smart Charging Trial

Mark Dale, Western Power Distribution

Esther Dudek, EA Technology

14:25-14:40

Consumers, Vehicles and Energy Integration Project

Liam Lidstone, Energy Technologies Institute (ETI)

14:40-14:55

Integrating electric vehicles into the energy grid; lessons learned from Hawaii and the potential for the UK and Europe to drive transformational change

Dr Jonathan Adey, Hitachi Europe Ltd

14:55-15:10

Smart charging projects: lessons learned from The Netherlands

Alex Earl, Alfen-ICU Charging Equipment

15:10-15:25

Smart EV: A new standard for managed electric vehicle charging, and what this means for the automotive and electric vehicle charging supply chains, and customers

Richard Hartshorn, Scottish & Southern Electricity Networks

Daniel Hollingworth, EA Technology

15:25-15:45

Q&A

Over 80 speakers will be sharing expertise at seminars and workshops over the two-day event. Senior figures from vehicle manufacturers including Nissan, Toyota, Ford Motor Company and Jaguar Land Rover will join experts from technology developers, Government and the energy sector, to review and discuss the future of low carbon vehicles and supporting energy infrastructure in the UK and Europe.

You can view the full seminar programme here:

www.cenex-lcv.co.uk/seminars

As well as the exhibition and seminars, LCV also offers you the opportunity to drive some of the very latest electric vehicles on Millbrook's circuits. In recent years there has been a large queue to drive the BMW i8, so get there early!

Cenex is celebrating its 10th annual Low Carbon Vehicle (LCV) event this year and will be hosting an evening reception at the Cenex-LCV event on 6 September.

For more information about LCV, The UK's Premier Low Carbon Vehicle Event, visit the all-new website www.cenex-lcv.co.uk

Time is running out to register for the event; you can do this here: www.onlineregistration.co.uk/shows/cenex/17/regcenex.php

5 September 2017

RESEARCH SHOWS THAT SMART CHARGING CAN BE KEY SOLUTION TO CHALLENGE OF NETWORK DEMAND FROM EVS

Initial findings of Electric Nation trial suggest that smart charging can be a key solution to the impact of increasing numbers of EVs on the electricity network

Vehicle to grid charging – soon to be trialled as part of the Electric Nation project – will provide further help

The main issue around grid capacity relates to clusters of EVs charging on local electricity networks at peak times

The Electric Nation project is due to announce its initial findings on the first day of the Cenex Low Carbon Vehicle event (LCV2017), held at Millbrook on 6-7 September 2017, which will show that smart charging can provide a key solution to the challenge of the demand from increasing numbers of electric vehicles (EVs) on electricity networks.

Recent reports in response to the government's announcement about the ban of petrol and diesel cars by 2040 have raised concerns about the ability of the UK's electricity networks to provide sufficient power for increasing numbers of EVs.

National Grid's 'Future Energy Scenarios' (FES) included a number of scenarios which estimated the additional system-wide peak electricity demand from electric vehicles would range from 6 to 18GW in 2050. A lower increase (6 GW) is predicted when the use of smart charging and time of use tariffs is widespread. Further reductions in peak electricity demand are also likely to be possible by vehicle to grid charging (V2G); Electric Nation will be incorporating V2G trials into the project.

Electric Nation is investigating the benefits which smart charging could provide for local electricity networks, where additional demand from local clusters of EVs could require reinforcement of these networks.

Electric Nation's initial findings to be presented at LCV2017 are based on almost 70,000 hours of charging data, and show that 48% of plug-in events begin between 5pm and midnight. On average, these vehicles are plugged in for 12 hours, but are only charging for just over two hours. This suggests that there is likely to be sufficient flexibility to manage charging away from peak electricity demand periods. This will be explored in detail through the smart charging trial taking place during the rest of 2017 and 2018.

Over 40 different makes and models of EVs are taking part in the trial, and the geographical hot spots of EV owners who are taking part will be revealed in Electric Nation's presentation at LCV.

Electric Nation, one of Western Power Distribution's (WPD) innovation projects, with collaboration partners EA Technology, DriveElectric, Lucy Electric GridKey and TRL, is believed to be the world's largest trial of its kind, and is offering a free smart charger to 500-700 electric vehicle drivers.

The project is ahead of schedule with recruitment, having received over 2,500 enquiries, which have translated to over 700 signed expressions of interest, of which over 400 have been approved, and over 350 smart chargers have now been installed.

Mark Dale, Innovation Manager, Western Power Distribution, comments "The UK Government is looking to mandate smart charging, and the Electric Nation project is providing evidence about whether it will work. Research shows that at least 30% of Britain's low voltage networks are likely to require investment by 2050 to charge EVs, costing at least £2.2bn. Our early findings suggest that smart charging could reduce, delay or avoid the need to upgrade or replace these networks."

The Electric Nation trial is taking place in the WPD network areas in the Midlands, South West and South Wales.

Places on the trial are filling up fast, therefore any new EV owners who want one of the latest smart chargers installed free of charge are advised to apply as soon as possible.

For more information and to check eligibility visit www.electricnation.org.uk

Electric Nation can be found at stand number C3 100-101, and Electric Nation's presentation is taking place on day one of the LCV event, Wednesday 6 September, in the Presentation Zone, Hall 2, starting at 2pm.

For more information about LCV2017 visit www.cenex-lcv.co.uk

Twitter @electricnation_

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11 October 2017

ELECTRIC NATION AT WPD'S BALANCING ACT CONFERENCE

A presentation about Electric Nation, providing information for the first time about the project's Network Assessment Tool, was delivered at Western Power Distribution's Balancing Act Conference which took place in London on 5 October 2017.

The 'Future Networks – A Balancing Act' event was held at the Park Plaza, Westminster Bridge, organised by WPD's Innovation division, with an audience primarily comprised of members of the DNO community and the energy industry.

The Electric Nation presentation, delivered by Mark Dale, Innovation Manager, Western Power Distribution, together with Nick Storer and Daniel Hollingworth from EA Technology, explained the need for smart charging as numbers of electric vehicles increase.

Additional loading on low voltage (LV) electricity networks from EVs charging at peak times would result in at least 30% of these networks in Britain requiring investment by 2050, costing at least £2.2bn (based on research from My Electric Avenue).

Smart charging, as being trialled in Electric Nation, could reduce, delay or avoid the need to upgrade or replace networks.

The presentation also explained about the Electric Nation test system, which aimed to test smart charging algorithms before release to trial participants, and also to check the response of different cars to demand management. During the first year of the project

the first algorithm configurations for GreenFlux and CrowdCharge were successfully tested ready for deployment, and 10 makes and models of EVs were tested.

There were also ten pilot installations between November and early December 2016, with the learning used to inform installer training before the main trial began.

Information was presented for the first time about Electric Nation's Network Assessment Tool, which aims to identify parts of networks that are susceptible to growing levels of EV charging, how many networks will need reinforcement, when this will be needed, and which solution will be most cost effective.

Well over 400 smart chargers have now been installed as part of the project, with 40 different makes/models of EV on the trial, and Electric Nation is on track to achieve its target of recruiting 700 people buying or leasing new electric vehicles in the very near future.

1. Appendix 5 – EV Industry News

26 July 2017

NEW DIESEL AND PETROL CARS TO BE BANNED FROM 2040 IN UK

New diesel and petrol cars and vans will be banned in the UK from 2040. This announcement from the government is in response to being taken to court by Environmental law firm ClientEarth over levels of air pollution.

The announcement mirrors that of France; earlier in July, President Emmanuel Macron said that diesel and petrol cars would be banned in France from 2040.

The UK government had already said that it wanted virtually all cars on sale in 2040 to be electric. So today's news isn't a surprise to the industry, and as 2040 is 23 years away, it still leaves the issue of what happens to clean up air quality in the immediate short-term.

Diesel is still seen as the primary culprit for poor levels of air quality in urban areas; older vehicles, including buses, taxis, vans and trucks, are responsible for the worst diesel emissions; the latest Euro 6 standard diesel cars are much cleaner.

So electric cars are seen as the way forward. BMW announced yesterday that a fully electric MINI would be built in the UK in 2019. Volvo also recently announced that all its new cars from 2019 will have an electric motor – this means that the company will still be offering petrol and diesel engines, but in combination with plug-in hybrid powertrains.

The government recently released its draft clean air strategy for consultation, which included proposals for clean air zones in the most polluted urban areas. However overall this document put the onus on local authorities, and didn't contain many revolutionary

ideas for the short term. The document contained no confirmation of a diesel scrappage scheme. The government now has to publish the final version.

Environmental law firm ClientEarth took the government to court over illegal levels of harmful pollutant nitrogen dioxide. Air pollution is thought to be linked to about 40,000 premature deaths a year in the UK, and transport also contributes to greenhouse gas emissions. ClientEarth's Chief Executive James Thornton recently spoke at the Low Carbon Vehicle Partnership's Annual Conference at City Hall in London.

In combination with ever more news items about the increasingly rapid switch to electric cars, last week the National Grid published its 'Future Energy Scenarios' (FES) report, which stated that electric vehicles could create an additional peak electricity demand of up to 18 GW by 2050, equivalent to an additional 30 per cent on top of today's peak demand of 60 GW. However smart charging, as being trialled by the Electric Nation project, could play a key role in helping to tackle this challenge.

10 August 2017

BMW ELECTRIC VEHICLE SALES INCREASE BY 75%

More than 50,000 BMW i, BMW iPerformance and electrified MINI vehicles have been delivered to customers around the world since the start of the year.

The BMW Group now has a total of nine electrified automobiles on the market: sales of these vehicles totalled 50,711 in the first seven months of the year, an increase of 74.8% on the same period last year. This makes the BMW Group the world's third biggest BEV/PHEV manufacturer. The BMW i3 is the best-selling compact battery-electric vehicle in the Premium Segment worldwide since 2014, with the sales curve showing a clear upward trend.

The BMW Group had its best July ever, with sales in the month totalling 180,726, a 0.4% increase year-on-year. The company also sold more vehicles than ever before in the first seven months of the year with a total of 1,401,551 (+4.3%) vehicles delivered to customers around the world.

Global BMW brand sales in July were at last year's extremely high level. A total of 153,511 (+0.1%) BMW automobiles were delivered to customers around the world. The first seven months of the year were the most successful ever for the brand with 1,191,547 vehicles sold, an increase of 4.5%. A wide range of models throughout the portfolio contributed to this growth. The BMW X family continues to be a major growth driver – despite the current model changeover of the BMW X3 – with overall BMW X sales up 15.4% (407,492). The BMW 1 Series (107,460 / +8.5%) and BMW 7 Series (37,159 / +21.9%) also achieved notable growth. Meanwhile in July, the new BMW 5 Series achieved sales growth of 34.9% (17,712) in markets excluding China. The BMW 5 Series is currently in model changeover in China, where BMW 5 Series sales in July are down 47.2% (6,766) year-on-year.

Sales of MINI brand vehicles also continued to grow in July, with 26,974 units delivered to customers around the world, an increase of 2.0% compared with the same month last year. In the first seven months of 2017, a total of 208,188 MINI vehicles were sold, an increase of 3.4% year on year. The MINI Convertible (21,248 / +23.4%) and MINI Clubman (34,086 / +6.5%) showed very positive sales growth in the year to date. The new MINI Countryman was the main growth driver with sales up 33.5% (6,810) in July.

“Following a record first half-year, our sales in July remain at a very high level, with profitability our primary focus,” said Dr Ian Robertson, Management Board Member for Sales and Brand BMW. “Despite continuing headwinds in the USA, as well as the model changeover of the BMW X3 and the BMW 5 Series in China, we were still able to achieve last year’s high sales levels, due to our policy of balanced global sales growth. Sales of our electrified vehicles continue to develop extremely well, with all nine of our electrified cars playing their role in this success,” he continued.

1st September 2017

NEW WLTP & RDE ECONOMY & EMISSIONS TEST START TODAY

From today, 1 September 2017, every new car model will be tested against the new World Harmonised Light Vehicle Test Procedure (WLTP). By September 2018 all new cars on sale will have WLTP test information. The new Real Driving Emissions (RDE) test also comes into force.

WLTP aims to give car buyers comprehensive and reliable mpg figures and help them compare and select the car best suited to the type of driving they do.

The Low Carbon Vehicle Partnership (LowCVP) has launched an information portal to give clarity and consistency about the introduction and progressive adoption of the new WLTP fuel economy test, at www.lowcvp.org.uk/initiatives/fuel-economy

Importantly, the new WLTP test will become the only truly comparable measure across every car and manufacturer which is verified by governments and certification bodies and this data should not be confused or compared with other road tests or 'real world' indices.

While WLTP tests are conducted in a laboratory to ensure accuracy and repeatability, they will introduce much more representative testing conditions based on data from 'real driving' for new cars and will provide a more accurate basis for measuring emissions and calculating a car's fuel consumption. This will provide consumers with much more comprehensive and representative car performance data. The new test involves a significant number of key changes compared to the 'old' NEDC test.

The new test also places more emphasis on the detailed vehicle specification than the old test, when determining fuel consumption and CO_2 emissions. The recognition of factors such as the mass and aerodynamics of the vehicle, the rolling resistance of the

tyres and the impact of options fitted to the car by the manufacturer is greatly improved to give a more accurate set of values for an individual vehicle.

Most cars tested under WLTP are likely to show higher CO_2 emissions and lower fuel economy figures than the same car tested under the old NEDC test. This reflects much more accurately day-to-day driving, however the actual on-road consumption is completely unaffected by the test type.

Andy Eastlake, Managing Director, Low Carbon Vehicle Partnership, comments: “The figures from the new WLTP test are designed to really help consumers understand which powertrain technology and vehicle is best suited to their driving and journey patterns. The LowCVP is working with its stakeholder community to coordinate detailed guidance and the presentation of the new data and to maximise the benefit for motorists, to further encourage the uptake of low emission vehicles.”

Manufacturers and the Government’s Vehicle Certification Agency are expected to progressively start showing WLTP car performance figures on their websites from late 2017, as new models are approved.

Cars tested under WLTP will still have NEDC CO_2 and fuel consumption values reported until 2020. Manufacturers must continue to use the NEDC CO_2 figure to report against European CO_2 emission fleet average targets (which were set against NEDC) for new cars until the complete switch to WLTP.

From 1 September 2017 cars approved under WLTP will continue to be taxed against the NEDC CO_2 emission value, so there is no change to the CO_2 based taxation systems in the short term. This includes vehicle tax (VED) and company car tax (BIK). The LowCVP is working with all stakeholders to ensure a smooth transition of these regulations and policies after data becomes available for every new car.

FOR MORE INFORMATION ABOUT THE DETAILS OF THE WLTP FUEL ECONOMY TEST CLICK HERE

The Real Driving Emissions (RDE) test also comes into force today.

New models being developed for sale in the UK will need to prove their air quality credentials by passing a brand new Real Driving Emissions (RDE) test using special state-of-the-art portable emissions measurement (PEMS) equipment. This very sensitive equipment analyses the trace tailpipe emissions of pollutants, including NOX and particulates, while the car is driven in a wide range of both every-day and extreme conditions. This will ensure vehicles meet the tough Euro 6 emissions standard on the road as well as in the lab.

The new tests, which measure everything from fuel consumption and carbon dioxide (CO2), to nitrogen oxides (NOX), particulates by mass and number (PM/PN) and carbon monoxide (CO), are part of European regulations designed to improve air quality and tackle climate change. As well as a tough new laboratory test, all newly launched car models will have to undergo robust official on-road testing before they go on sale – an element that no other vehicle testing regime in the world requires.

Over the past 20 years, vehicles have advanced at a rapid rate, with high tech safety and comfort features, from electronic stability control, parking sensors and airbags, to air conditioning, heated windscreens and electric seats now increasingly fitted as standard. However, the way they are tested has not kept pace, resulting in a gap between performance in the lab and on-road where fitment of these in-car technologies can differ

across models, and conditions such as speed, congestion, road surface and driving style can vary dramatically from journey to journey and driver to driver.

EU regulators and national governments have been working, with the support of industry, to address this by making testing more relevant to modern vehicles and consumer needs.

Mike Hawes, SMMT Chief Executive, said, “We welcome this challenging new regime, which will provide hard evidence that the industry’s ongoing investment in ever more advanced technology is delivering on air quality goals. Combined, these new and demanding tests will soon give consumers emissions performance information that is far closer to what they experience behind the wheel – and inspire greater confidence that the new cars they buy are not only the cleanest, but the most fuel efficient ever produced.”

The WLTP and RDE tests replace the previous and long-outdated laboratory test known as the New European Driving Cycle (NEDC), which was designed back in the 1980s and last updated in 1997. Revolutionary in its day, NEDC was intended to provide consistent benchmarking information for buyers across Europe as well as determining whether cars meet minimum air quality standards and providing the basis for the UK’s CO2-based Vehicle Excise Duty system.

Newly designed cars will start to be tested under the new regime over the coming months after the final piece of legislation specifying the requirements that allow testing authorities and manufacturers to prepare was published in July this year. This means consumers could start to see these brand new models arrive in showrooms from as early as next year. By 1 September 2018, all new cars on sale will have undergone WLTP testing and by 1 September 2019, all will have undergone the full RDE testing for both NOx and PN.

The Real Driving Emissions (RDE) test will ensure the vehicle’s lab test performance is matched on the road. RDE works by fitting equipment called a Portable Emissions Measurement System (PEMS) to the vehicle, which measures emissions while the vehicle is driven on the road.

Given the huge differences in temperature, road and vehicle conditions as well as driving styles, no lab test can ever replicate exactly what happens on the road. RDE testing will demonstrate that new cars’ low emissions are achieved in these real world conditions.

RDE will also include some extreme driving conditions, rarely encountered by most motorists, for example carrying a heavy load up a steep hill at high speed in very low temperatures.

To allow for the margins of error in highly sensitive PEMS equipment and the test itself, there is a tolerance allowed on top of the laboratory limits – known as the conformity factor.

If the vehicle meets these requirements, as independently witnessed by a government-appointed independent approval agency, it will be approved for sale in Europe.

13 September 2017

THE TOP 10 ELECTRIC CAR NEWS STORIES FROM THE 2017 FRANKFURT MOTOR SHOW

Electric cars were the big news at the 2017 Frankfurt Motor Show. This wasn't a surprise after a string of recent announcements about electric vehicles, including the UK government's ban on petrol and diesel cars from 2040, as well as more recently China considering a fossil fuel car ban.

Volkswagen, along with other manufacturers, talked about all their models being available as electric cars, with various targets between 2020 and 2030 being quoted by different brands.

Interestingly, many manufacturers are now starting to consider the impact that electric vehicles have on the electricity grid, with Mercedes, Renault and Honda all announcing various energy storage initiatives to accompany their sales of EVs.

BMW revealed the BMW i Vision Dynamics which aims to provide a rival to the Tesla Model 3. And Audi went one step further, showing the Audi Aicon Concept, which as well as being fully electric, is also fully autonomous – and it can even charge itself without any human input.

After much progress has been made with electric cars for consumers, it's a relief that we're soon to start removing old diesel taxis and their emissions that have such a negative impact on local air quality from the streets of cities such as London, thanks to the new plug-in hybrid LEVC TX Taxi.

But perhaps most exciting of all was the news that Jaguar is creating its own one-make electric race series with its forthcoming I-PACE SUV, which will run in the form of support races to Formula E.

HERE ARE OUR TOP 10 ELECTRIC CAR NEWS STORIES FROM FRANKFURT

NEW BMW ELECTRIC VEHICLES AT THE FRANKFURT MOTOR SHOW

BMW has a number of new electric models on display at the Frankfurt Motor Show, including the world premiere of the BMW i Vision Dynamics. Read more

MINI ELECTRIC CONCEPT

The MINI Electric Concept showcased in Frankfurt previews a volume production model that will follow in 2019. Read more

JAGUAR'S FIRST PRODUCTION BATTERY ELECTRIC VEHICLE RACE SERIES

After becoming the first premium manufacturer to enter Formula E in 2016, Jaguar has created the world's first production battery electric vehicle race series. Read more

MERCEDES-BENZ CONCEPT EQA

The Mercedes-Benz Concept EQA is the company's first all-electric EQ concept vehicle in the compact segment. Read more

AUDI AICON

The Audi Aicon Concept, on display at the Frankfurt Motor Show, is a fully electric, fully autonomous car that will charge itself with no human input. Read more

VOLKSWAGEN I.D. CROZZ

The Volkswagen I.D. CROZZ zero emission SUV concept vehicle has been further developed and offers a preview of the production model of 2020. Read more

VOLKSWAGEN GROUP LAUNCHES ROADMAP E ELECTRIFICATION INITIATIVE

The Volkswagen Group claims it is launching the most comprehensive electrification initiative in the global automotive industry with its ‘Roadmap E’, resulting in the company electrifying its entire model portfolio by 2030 at the latest. Read more

HONDA URBAN EV CONCEPT

The pure electric Honda Urban EV Concept has made its global debut at the 2017 Frankfurt Motor Show. Read more

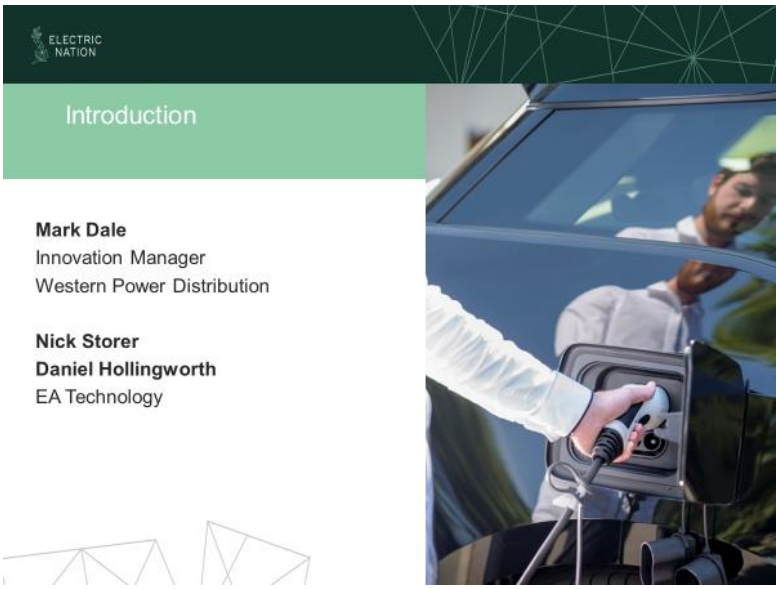
RENAULT SYMBIOZ

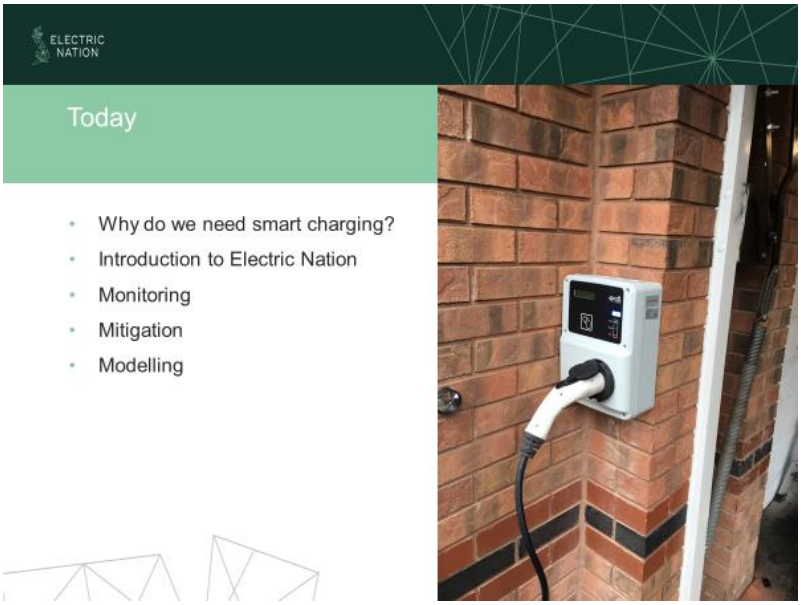
The SYMBIOZ concept showcases Renault’s vision of the car of the future and its role in our lives inside and outside the car. It comprises a car, a demo car and a home. Read more

LEVC ELECTRIC TX TAXI

The London EV Company (LEVC), formerly the London Taxi Company, has premiered its all-new electric TX six-seater taxi at the Frankfurt Motor Show. Read more

Appendix 6 – Balancing Act presentation





WESTERN POWER DISTRIBUTION

INNOVATION

FLEXDGRID | PLUGS AND SOCKETS | SOLA BRISTOL | LOW CARBON HUB | OPEN LV (NEW!) | NETWORK EQUILIBRIUM | SMART ENERGY ISLES | NETWORK TEMPLATES | FALCON

Future Networks Programme

Assets

- Telemetry
- Decision support
- Improved assets
- New assets
- Flexibility
- Automation
- Incident response

Customers

- New connections
- Upgrades
- Information
- Self Serve
- Products/Service
- Tariffs
- Communities

Operations

- Reliability
- Forecasting
- DSO
- DSR
- GBSO Interface
- Efficiency
- SHE and Security

Network and Customer Data

- Airborne Inspections
- AIRSTART[1]
- Telecoms Analysis
- Superconducting Cable
- SF6 Alternatives
- MVDC Test Lab
- Smart Energy Laboratory
- Statistical Ratings
- Primary Network Power Quality Analysis
- Hybrid Heat Pump Demonstration
- Hydrogen Heat & Fleet
- Carbon Tracing
- HV Voltage Control
- Solar Storage
- LV Connect and Manage
- Sunshine Tariff
- CarConnect
- Industrial & Commercial Storage
- DSO/SO Shared Services
- Project SYNC
- Project ENTIRE
- Smart Meter data for Network Operations
- Distribution Operability Framework
- Times Series Data Quality
- Voltage Reduction Analysis
- LV Connectivity
- Smart Systems and Heat[2]

Note: 1 – Funded by Aerospace Technology Institution; Note 2 – Funded by the Energy Systems Catapult

ELECTRIC NATION

LOW VOLTAGE (LV) NETWORK INNOVATION

LV NETWORK DATA

THE **OPENLV** SOLUTION

APPS

ELECTRIC NATION	CONNECT & MANAGE	FREEDOM	I&C STORAGE
Chargepoint Management	Demand Control	Heat Optimisation	Battery Management

ELECTRIC NATION

Proving the benefits of smart EV charging for both customers and local power networks

- The world's largest EV trial (500-700 participants)
- 3 year project (2016-2019)
- Involving all types of plug in vehicles (PHEV/EV)
- Conceived, designed, and led by EA Technology

Modelling

Monitoring

Mitigation

COLLABORATION PARTNERS

ea technology | drivelectric | Lucy Electric | TRL

WESTERN POWER DISTRIBUTION

Serving the Midlands, South West and Wales

ELECTRIC NATION

YOUR ELECTRIC VEHICLE YOUR SMART CHARGE

MONITORING

IS EV CHARGING CAUSING EXCESSIVE DEMAND?

ELECTRIC NATION

Why do we need smart charging?

- EVs will require the generation and transmission of additional electricity to charge up:
  - Challenges for the generation industry and National Grid
  - And Distribution Network Operators in their networks down to 11kV network level
- For Distribution Network Operator's on 11 kV and LV networks EV loads may overload these networks – in certain seasons and times of day
- Additional loading on LV networks would result in at least 30% of these networks in GB requiring investment by 2050 costing at least £2.2bn *(My Electric Avenue)*
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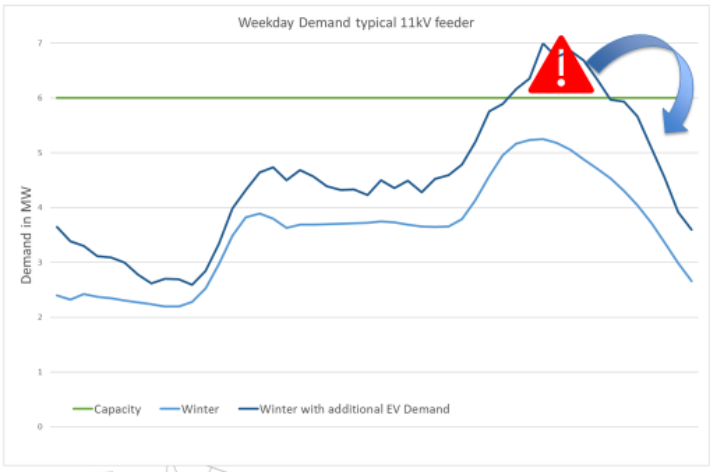
- Costs of upgrades go onto customer bills – a hidden cost of EV ownership?
- **Smart charging could reduce/delay or avoid the need to upgrade/replace networks**
- **UK Government looking to mandate smart charging**
  - **This project will provide evidence whether it will work**

ELECTRIC NATION



ELECTRIC NATION

Monitoring – Lucy Electric GridKey

- Using Lucy Electric GridKey's monitoring equipment
- Initial data gathering exercise carried out at Millbrook Proving Ground.
  - Capturing EV resistive load signatures on LV feeders
  - Variety of charging cycles with a variety of commercial vehicles
- Next step - develop algorithm to detect probability of EVs on the network.
  - Statistical model used initially, combining general load of a substation and injecting vehicle load signatures.
  - Using data where it is known if EVs are present/not present to validate results.

Further development of algorithm to include neural net approach to improve performance – increased detection probability / decreased false detection.

Output to potentially be integrated into other programmes such as OpenLV – providing load data for EV demand management services.

general load signals from random substations

vehicle load signatures from Millbrook

ELECTRIC NATION

YOUR ELECTRIC VEHICLE YOUR SMART CHARGE

MITIGATION

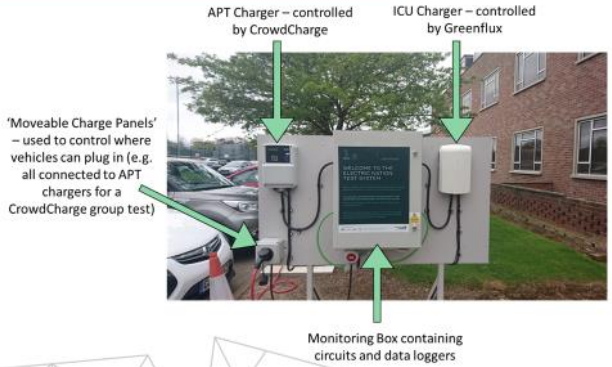
CUSTOMER TRIAL SMART CHARGING

ELECTRIC NATION

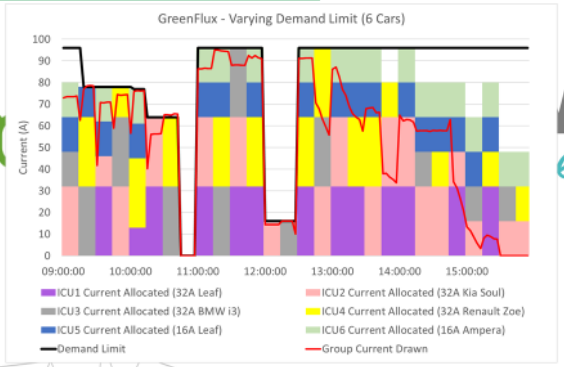
Test system (1)

- Test system designed, built and commissioned by end September 2016
- Purpose of the test system:
  - Test smart charging algorithms before release to trial participants
  - Check the response of different cars to demand control
- During 1st year of the project:
  - 1st algorithm configurations for GreenFlux and CrowdCharge successfully tested ready for deployment
  - 10 makes/models of EVs tested
- Details reported in Algorithm Development and Testing report – available online: https://www.westernpowerinnovation.co.uk/Document-library/2017/CarConnect/CarConnect-Algorithm-Development-and-Testing.aspx

Test system (2)

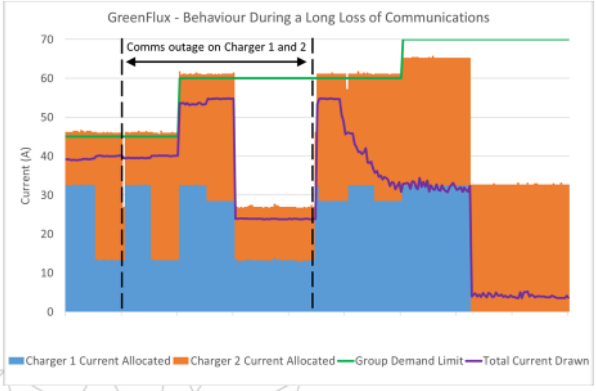


Test system – smart charging in action



For more test results: https://www.westernpowerinnovation.co.uk/Document-library/2017/CarConnect/CarConnect-Algorithm-Development-and-Testing.aspx

Test system results - Examples



ELECTRIC NATION

Pilot installations

- Purpose of pilot installations is to test:
  - Ordering and installation procedures
  - Communications in household scenario
  - Sheltered environment to test any troubleshooting
- 10 pilot installations in November and early December 2016
- Learning used to inform installer training before main trial began

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Marketing and PR – The strategy

- Underpins and supports all recruitment and dissemination activity
- All project partners engaged in the process
- Established key communication messages
- Recommendations:
  - DriveElectric to encourage people taking out new plug-in leases to take part
  - Need to encourage manufacturers, and critically their dealers, to promote the project
  - Wider marketing, communication and PR, ultimately targeting all people who may be considering buying a plug-in vehicle in the near future
- Managing customer expectations critical
- Go Ultra Low partners key

ELECTRIC NATION

Gearing up to project launch

- Branding established
- Professional images
- Website developed (four weeks!)
- Electric Nation short video produced
- Social media accounts set up
  - 853 followers
- Press release template agreed
- E-newsletter template created
- LCV2016 exhibition stand panels produced
- Customer information and welcome packs
- Posters produced
- Electric Nation desktop model
- Guide for WPD call centre staff
- PR & social media protocols for partners
- Project launched at Cenex LCV, September 2016
  - Fully Charged film on Electric Nation achieved 33,777 views

ELECTRIC NATION

ELECTRIC NATION

Marketing & PR - Supporting trial recruitment

- Maintaining / updating materials
- Responsive to all recruitment needs
- Social film
- 25+ project news items on http://www.electricnation.org.uk/
- 70+ industry news items on the website
- 7 press releases sent out to mass media / targeted regional and local media
  - First installs covered in Milton Keynes, Nottingham (GUL areas)
  - 3,250 media cross-industry contacts
- Brochure specifically designed for Renault to support recruitment via dealers
- Branding for test rig and smart charger stickers
- Weekly marketing and PR support for DriveElectric recruitment events
- Blogs

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Marketing & PR – dissemination activity

Project e-newsletters x 5
Customer e-newsletters x 3 (for DriveElectric)
Focused events across automotive, electricity and policy stakeholder audiences:

- EV Network Group
- LCNI 2016
- V2G Workshops
- REA Connected Systems
- New Energy Forum
- Smart Energy Marketplace
- All Energy
- Infrastructure event
- Powering the Low Emission Future
- Cenex LCV2017
- Balancing Act
- UK EV Policy event
- LCNI

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Recruitment

- Promotion events
- Website
- Referrals
  - Dealers
  - Installers
- Expression of interest
  - Eligibility check
- Installation self survey
  - Installer approval

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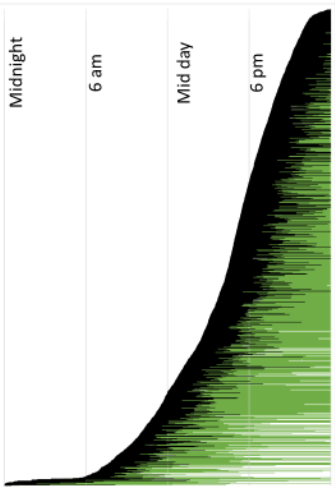
Installation

- Electrical Installations
  - Mostly Successful
  - Maximum Demand issues…
- Communications - Challenging!
  - GreenFlux/ICU: 80% availability
  - CrowdCharge/APT: 40% →60%
- Hardware/firmware
  - Faults & changes
- Broadband Internet
  - Reliability
  - WiFi link
- Customer behaviour

ELECTRIC NATION

Customer trial

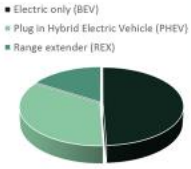
- 2017 – getting cohort built
  - Charge at will → demand management
- What we hope to get
  - Data to identify factors that influence customer behaviour under demand management
    - Size of battery vs EV use
    - PHEV vs BEV
- Use this to design further trials in 2018
  - Including more sophisticated DM systems
  - Customer interaction
  - SOC data

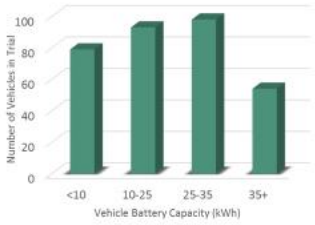


ELECTRIC NATION

The world's largest EV trial

- 400 chargers (and counting)installed throughout WPD's licence areas
- 40 different makes/models of EV
- Over 5,500 charging events captured already leading to 66,452 hours of charging data





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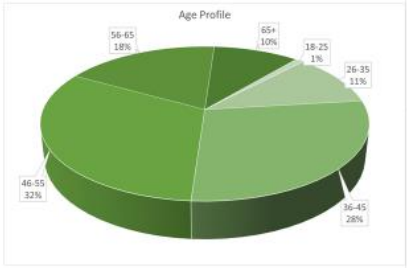
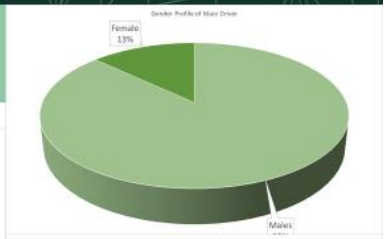
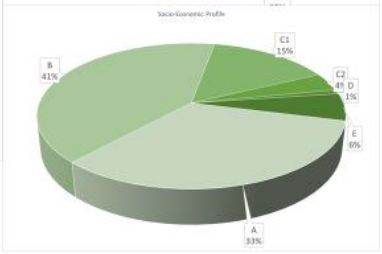
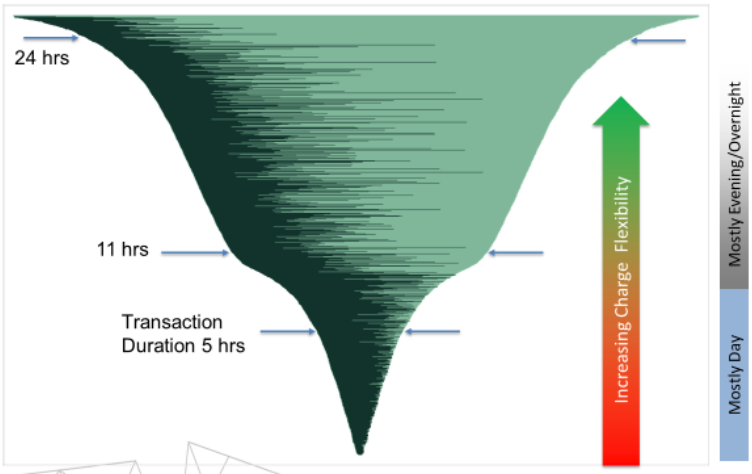
Trial Cohort





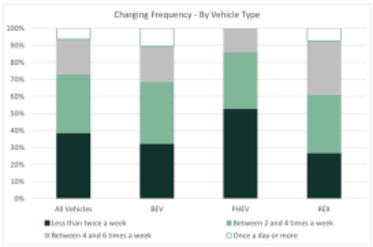


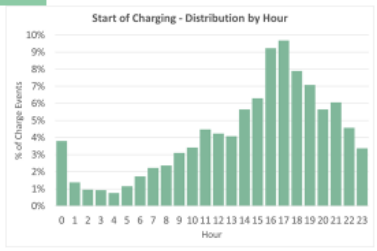
ELECTRIC NATION



ELECTRIC NATION

What's the additional load from Plug-In Vehicles?





- Very few people plug in every day, or even most days
- The majority is less than 4 times a week
- PHEV drivers (so far) appear to charge less frequently

- Peak of charging events occurring in the early evening
- Some charging begins at night – mainly using timers (plug-in is earlier)
- Some charging begins in the middle of the day

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Vehicle to Grid (V2G)

- What is it?
  - Charging equipment that allows an EV to act as a small scale generator
  - Could provide an additional source of flexibility – benefits for decentralising generation and increasing use of renewables
- Electric Nation will be testing a single phase domestic scale V2G charger late 2017/early 2018
- Aim to get a pilot scale customer deployment mid 2018 to investigate potential benefits of domestic V2G to distribution networks
  - Voltage support
  - Thermal/Load management
- Customers could benefit from V2G
  - Supplying special power services to the electricity network & grid
  - Generating income to offset cost of EV ownership

ELECTRIC NATION

YOUR ELECTRIC VEHICLE YOUR SMART CHARGE

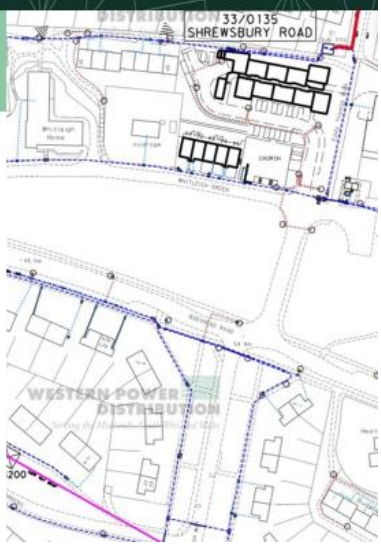
MODELLING

NETWORK ASSESSMENT TOOL

ELECTRIC NATION

Network Assessment Tool - The problem

- EV charging will lead to overloads in some cases
- DNOs can't implement solutions overnight – they need early warning
- Key questions:
  - How many networks will need reinforcement?
  - When will it be needed?
  - Which solution is the most cost effective?
- Answering complex questions usually needs good data



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Network Assessment Tool - What is it?

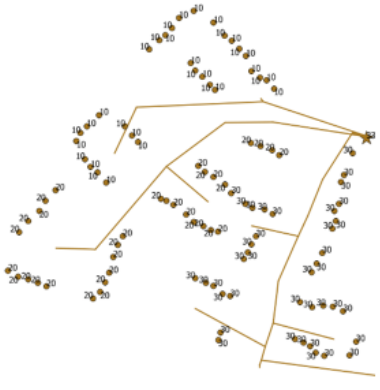
- A modelling tool that can assess:
  - Likelihood of overload and voltage excursion
  - Range of scenarios
    - EV uptake / time
    - Usage characteristics
    - Consumer car choices
- Two main areas:
  1. Network-wide overview
  2. Detailed analysis and solution guidance

ELECTRIC NATION

What we have done with available data (1)

Developed spatial algorithms to build network connectivity

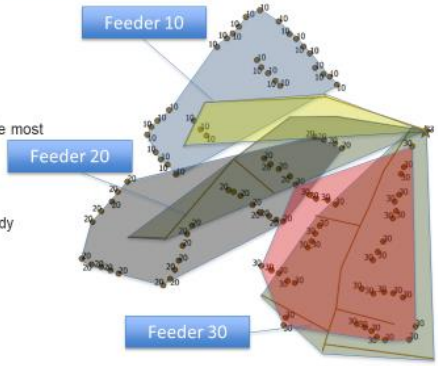
- Filling in the missing links
  - Identify first legs from substation
  - "Connect" cables
  - Customers to cable routes…



ELECTRIC NATION

What we have done with available data (2)

- Spatial algorithms also associate
  - Customers groups to feeders
  - Can identify NOP locations
- Applied this to a sample pool of data
  - Iterate through this process to find the most suitable algorithm set and order
- All this enables…
  - Better understanding of network characteristics to allow a network study



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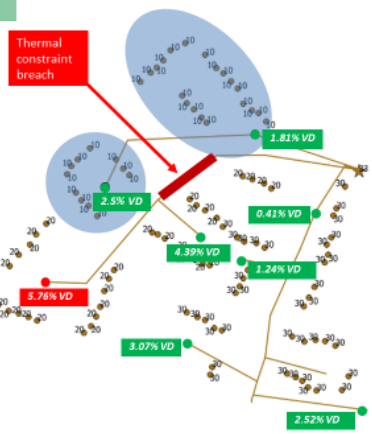
Network Assessment

- DEBUT calculation engine to calculate
  - Expected voltage drops
  - Thermal utilisation
- Present scenarios
- WPD use DEBUT as a design tool
  - Assessment is aligned with their standard practice



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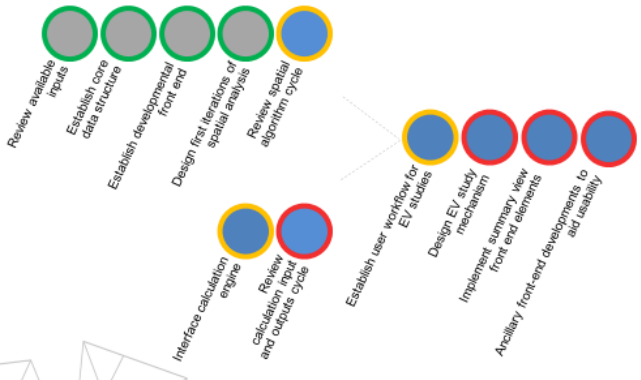
Resultant development path



ELECTRIC NATION

Highlighting potential problem feeders

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The user journey

Tolerance indications:

- *Number of network breaches*
- *Ability to accept EVs*

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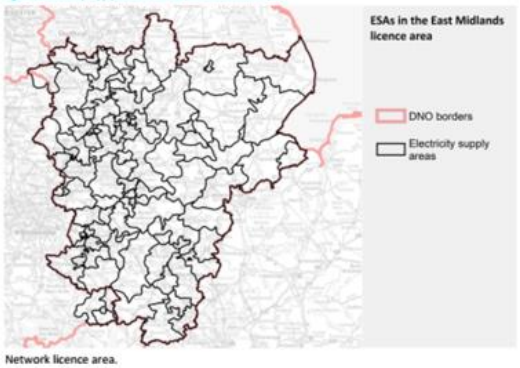
More likely to go down ESA route

Figure 2: Electricity supply areas in the East Midlands licence area



Network licence area.

Source RegenSW for WPD

ELECTRIC NATION

EV forecasting

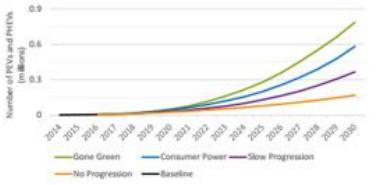
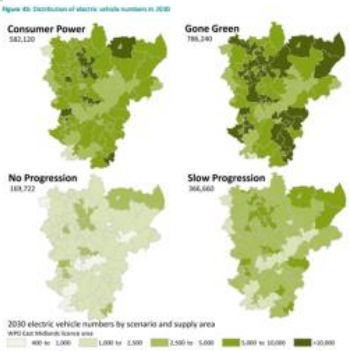


Table 37: Cumulative number of pure electric vehicles and plug-in electric vehicles in WPD licence area

	Baseline	2020	2025	2030
Gone Green	5,023	49,663	279,600	786,240
Consumer Power	5,023	45,463	199,800	582,120
Slow Progression	5,023	31,969	130,302	366,660
No Progression	5,023	26,245	79,002	169,722



Source RegenSW for WPD

ELECTRIC NATION

Tabular Views – reporting & data export

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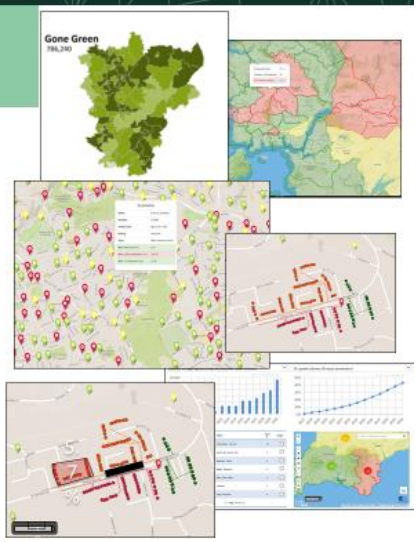
Further development

- Network assessment algorithm
- Building in EV forecasting
- EV penetration effects on networks
- Evaluation of solutions (e.g. Smart Charging)



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In summary – Electric Nation will…

- Establish a method for identifying EV contribution to high loads on LV Networks
- Demonstrate how smart charging could enable EV owners to charge at home while minimising increasing electricity bills, and whether this is acceptable to EV owners
- Show charger manufacturers and the whole electricity sector how smart chargers can work in the home and the value of this, including V2G
- Develop an LV network assessment tool that will identify parts of networks that are susceptible to growing levels of EV charging
  - And assess whether smart charging can mitigate this impact
    - To enable WPD to defer, minimise or avoid reinforcement works
- Inform Government thinking on smart charging

ELECTRIC NATION

YOUR ELECTRIC VEHICLE YOUR SMART CHARGE

Thank you

Any questions?

@ElectricNation_

Appendix 7 – CENEX LCV

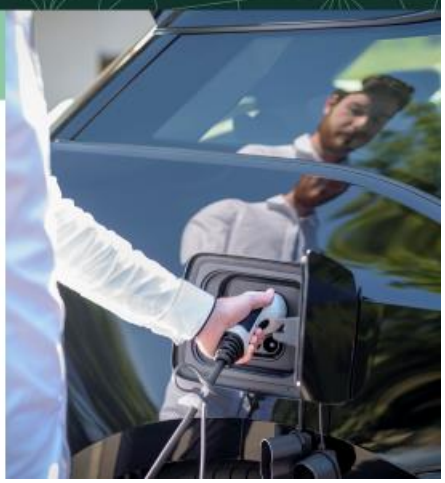
ELECTRIC NATION

Introduction

Mark Dale
Innovation Manager
Western Power Distribution

Esther Dudek
Senior Consultant
EA Technology

- Why do we need for Smart Charging?
- Early indicators from customer trial



ELECTRIC NATION

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Serving the Midlands, South West and Wales

ELECTRIC NATION

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- Costs of upgrades go onto customer bills – a hidden cost of EV ownership?
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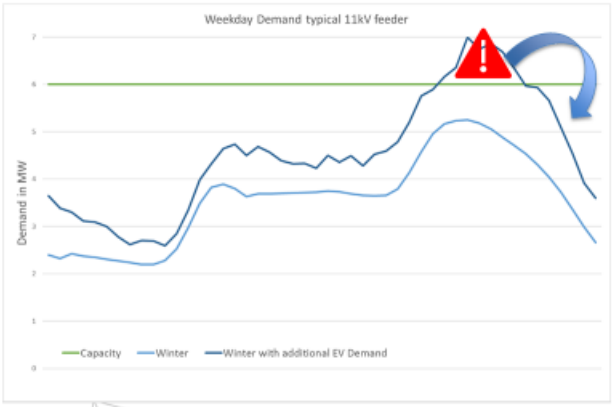
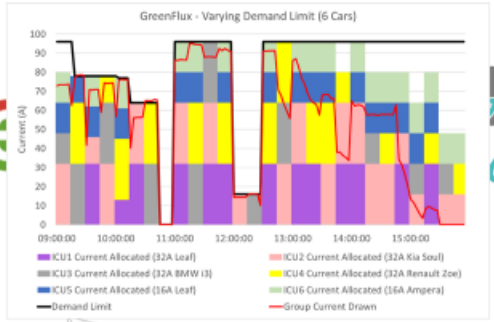
- **UK Government looking to mandate smart charging**
  - **This project will provide evidence whether it will work**

ELECTRIC NATION



ELECTRIC NATION

Smart Charging in Action



ROWD
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For more test results: https://www.westernpowerinnovation.co.uk/Document-library/2017/CarConnect/CarConnect-Algorithm-Development-and-Testing.aspx

ELECTRIC NATION

The World's Largest EV Trial

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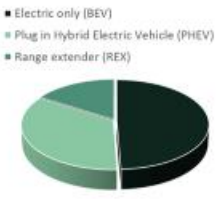
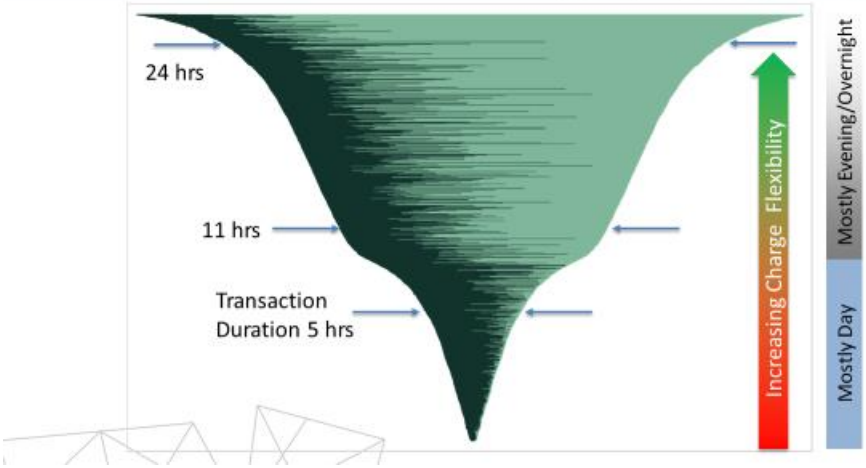
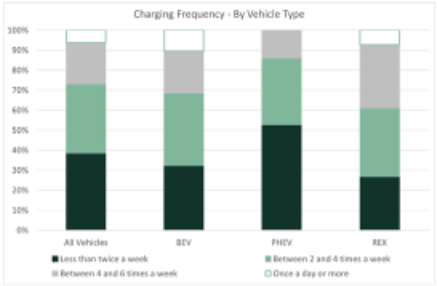


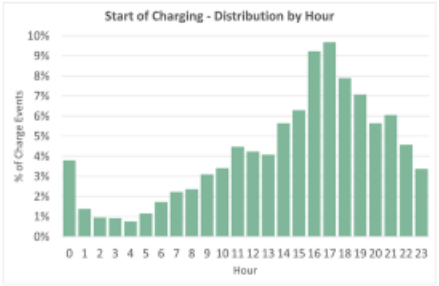
BMW TESLA NISSAN MITSUBISHI



What's the additional load from Plug-In Vehicles?



- Very few people plug in every day, or even most days
- The majority is less than 4 times a week
- PHEV drivers (so far) appear to charge less frequently



- Peak of charging events occurring in the early evening
- Some charging begins at night – mainly using timers (plug-in is earlier)
- Some charging begins in the middle of the day

Vehicle to Grid (V2G)

- What is it?
  - Charging equipment that allows an EV to act as a small scale generator
  - Could provide an additional source of flexibility – benefits for decentralising generation and increasing use of renewables
- Electric Nation will be testing a single phase domestic scale V2G charger late 2017/early 2018
- Aim to get a pilot scale customer deployment mid 2018 to investigate potential benefits of domestic V2G to distribution networks
  - Voltage support
  - Thermal/Load management
- Customers could benefit from V2G
  - Supplying special power services to the electricity network & grid
  - Generating income to offset cost of EV ownership

ELECTRIC NATION

Summary – Electric Nation Will….

- Demonstrate how smart charging could enable EV owners to charge at home while minimising increasing electricity bills, and whether this is acceptable to EV owners
  - Early findings show charging behaviour does create flexibility for smart charging at the key time of day for distribution networks
- Show charger manufacturers and the whole electricity sector how smart chargers can work in the home and the value of this, including V2G
- Produce the biggest ever statistically significant data set on smart EV charging at home – and this will be publicly available
- Inform Government thinking on smart charging

ELECTRIC NATION

YOUR ELECTRIC VEHICLE YOUR SMART CHARGE

Thank You

For more information come and visit us at Stand C3 100 - 101