



REPORT

Smart EV Customer Messaging Strategy

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Executive summary

The Smart EV project is funded by Scottish and Southern Electricity Networks through its Network Innovation Allowance, and delivered by EA Technology Ltd. All six GB Distribution Network Operators (DNOs) are project partners. It is a follow-on project to My Electric Avenue. The evidence from My Electric Avenue suggests that plug-in electric vehicles (EVs) will cause an impact on the local electricity network, requiring significant investment by DNOs – an estimated investment of £2.2 billion by 2050 will be needed to support EV uptake.

The roll-out of a demand side response solution needs consideration; specifically, that compatible charging points are required in advance of the predicted increase in EV numbers. The roll-out of 'smart' or managed charging will require careful messaging to customers.

The objective of the Smart EV project is to define an Energy Networks Association (ENA) Engineering Recommendation (or equivalent) that will allow the range of future EV chargers to interact with a common technical architecture for the purpose of load management on the network.

Integral to the project's success, a Customer Messaging Strategy is required to facilitate customer understanding and buy-in to EV demand management.

The scope of the Customer Messaging Strategy (CMS) under this report is to establish how best to communicate smart, or managed, EV charging to customers, to support customer acceptance and adoption of smart charging.

This report provides the DNO with a holistic customer messaging toolkit that can be used to engage customers through appropriate channels to introduce the concept and need for, and benefits of, smart charging.

Key recommendations

1. EV demand management messages should be tailored respectively to existing EV owners and customers considering buying an EV.
2. The design of the front cover of the customer information leaflet is critical to reading rates.
3. The relationship between DNOs (as distinct from energy suppliers) must be explained clearly to customers.
4. Reference to Government forecasts in literature should be updated to reflect recent Government announcements or changes in policy.
5. It is important to clarify the likely frequency and duration of smart charging events as part of the Customer Messaging Strategy.
6. Smart charging should be positioned as one of myriad techniques being utilised to manage impacts on electricity networks, and as being complimentary to ongoing investment into the network to safeguard network resilience.
7. Customers should be advised to ask their electricity supplier about time-of-use tariffs, which could help lower their bills as well as the load on the grid.
8. Multiple communication channels should be adopted to communicate key messages in print and digital formats.

9. DNOs are well positioned to communicate key messages and target them at customers likely to be affected.
10. The effectiveness of the customer communication strategy should be monitored as part of a longitudinal study to ensure that the executed strategy is adaptive to the changing environment.

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Contents

1.	Background and introduction.....	1
2.	Scope and objectives.....	2
3.	Definitions.....	2
4.	Customer Messaging Strategy	3
4.1	Overall objective of the Customer Messaging Strategy	3
4.2	The audience for the CMS	3
4.3	Key messages and recommended base content	3
4.3.1	Who is the DNO?	4
4.3.2	The need for smart charging	4
4.3.3	The role that DNOs play in facilitating EVs on their networks	5
4.3.4	The customer benefits of smart charging.....	5
4.3.5	How smart charging works and customer impact.....	6
4.3.6	Next steps	6
4.3.7	Frequently Asked Questions	7
4.4	Methods and frequency of communication	7
4.4.1	Recommended communications medium	7
4.4.2	Delivery options	7
4.4.3	Use of imagery and look of leaflet	8
4.4.4	'Smart Charging' or 'Managed Charging'	8
4.5	Campaign logistics	8
4.5.1	Campaign length and timing	8
4.5.2	Campaign monitoring.....	9
4.6	Recommendations	9
	A solution: smart charging	18
	Key findings	22
	Refinement of the information provided	22
	Overall perception of the improved customer leaflet	23
	Key findings	23
	Refinement of the information provided	27

Appendices

Appendix I	Engaged Customer Panel Report
Appendix II	SSEN Q&A Document
Appendix III	Customer leaflets

Figures

Figure I: ECP meetings	11
Figure II: ECP meeting dates.....	12
Figure III: ECP attendance	12
Figure IV: The Climate Change Act 2008 information card	16
Figure V: Problem statement information card	17
Figure VI: Smart solution information card	18
Figure VII: Front cover preference for the leaflet targeted at EV owners	25
Figure VIII: Front cover preference for the leaflet targeted at prospective EVs owners	27

Tables

Table I: Key messages to customers.....	20
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1. Background and introduction

The number of electric vehicles (EVs) in the UK is rising rapidly. In April 2017, there were 95,000 EVs (both pure electric and plug-in hybrid) in the UK, and by 2030 National Grid forecasts show that 5.8 million vehicles could be electric. This growth, coupled with UK Government targets for all new cars and vans to be zero-emission by 2040 and a policy drive towards smart charging under the Automated and Electric Vehicle Bill, advances the need for managed charging to enable electricity networks to facilitate rapid EV uptake.

My Electric Avenue, a pioneering project run by EA Technology Ltd and hosted by Scottish and Southern Electricity Networks (2012 – 2015), estimated that EVs could double the peak demand on local electricity networks. The cost to customers to accommodate this increase is estimated at around £2.2 billion. This would take the form of replacing electrical assets such as cables and transformers, with the associated disruptive street works that this would involve. The costs would ultimately be passed on to customers through their electricity bills.

The speed of uptake and limited visibility of EV charging on low voltage (LV) networks also means that Distribution Network Operators (DNOs) are likely to need solutions that can be rapidly deployed.

The Smart EV project is developing a specification for managed EV charging, intended as a proportionate and cost-effective solution compared with traditional reinforcement techniques. Through this project, the Government, consumers and stakeholders across automotive, utilities and the EV and charging point supply chain are being consulted to better understand the implications of managed EV charging and to seek endorsement of a solution. Ultimately, this solution is intended to benefit the customer by helping to provide a smooth transition to EVs charging on local electricity networks.

Implementation of smart (or managed) charging essentially means that there may be occasions when an EV driver will have their EV charging managed (typically in the evening in a domestic setting) by a third party, so that electricity networks are not overloaded by multiple EVs charging on the same street or housing estate. The Smart EV project has studied the impact of managed charging on EV drivers, in terms of how often and for how long any management would be necessary, and whether managed charging will have any material impact on an EV customer's travel plans following a demand management event.

The study showed that some networks could cope with 20% higher penetration of EVs, without overload, by restricting charging by four occasions in a given year, with each occasion lasting for under an hour. Each restriction would typically not be to completely stop charging but to throttle back the maximum rate. Consider an EV after a 50-mile round trip with a 7kWh charging rate, the vehicle would be fully charged after approximately two hours. In this example, with managed charging, to save four potential power outages, the charge time would be extended by just two minutes. As the penetration of EVs increases, the impact will be higher, but managed charging will still have a role in protecting the network so the DNO can take a considered approach on how best to serve those customers in the longer term.

The key message is that managed charging to protect LV networks will have negligible impact on the EV driver; even at high rates of EV penetration.

Given the nascent nature of EV demand management, it is incumbent upon DNOs to understand how to best and most effectively engage with its customers on this issue. This Customer Messaging Strategy will support DNOs in communicating the facts and benefits of managed EV charging to both EV and non-EV drivers.

2. Scope and objectives

The Smart EV project, through an engaged customer panel (ECP), has consulted with cohorts of EV users who drive at least once a week within Scottish and Southern Electricity Networks' licence areas. The purpose was to explore their knowledge of the electricity industry and understand their points of view about responsibility for 'keeping lights on' as the use of electricity evolves.

Critically, the ECP was asked for its views on how best to message general customers about the need for and the advent of demand control for plug-in vehicles (EVs); who is best placed to take responsibility for that messaging, and which methods of communication are deemed most effective.

The learning derived from the ECPs has been analysed and used to inform the Customer Messaging Strategy (CMS) that forms the body of this report. This strategy can be used as the basis of an engagement platform for use by all GB Distribution Network Operators, to support the standard mechanism developed under the Smart EV project, to facilitate managed EV charging across GB.

3. Definitions

Abbreviation	Term
CMS	Customer Messaging Strategy
DNO	Distribution Network Operator
ECP	Engaged customer panel
EV	Electric vehicle
FAQ	Frequently asked question
GB	Great Britain
LV	Low Voltage
OLEV	Office for Low Emission Vehicles
EV	Plug-in electric vehicle
Q&A	Question and answer
V2G	Vehicle-to-Grid

4. Customer Messaging Strategy

4.1 Overall objective of the Customer Messaging Strategy

The objective of the Customer Messaging Strategy (CMS) is to give DNOs the communications framework with which to engage with their customers, to introduce them to the concept of smart charging. The CMS will:

- Identify the audience with whom the DNO needs to communicate
- Identify the key messages to be communicated
- Recommend methods and frequency of communication to customers
- Recommend next steps for DNOs to support customer adoption and acceptance of smart charging

4.2 The audience for the Customer Messaging Strategy

The Customer Messaging Strategy has two main audiences. The first is households who already own an EV. The second audience is households who may be interested in owning an EV. The two audiences will require background information and messaging about smart charging. Existing EV drivers will likely already be switched on to the benefits of owning and driving an EV; non-EV owners may not have this level of awareness and may benefit from information around the general advantages of owning an EV.

4.3 Key messages and recommended base content

Any communication should clearly explain the likely consequences of smart charging. Leaflets (for example) should tell the customer how many times a year smart charging is likely to be implemented and how long any curtailment or event is likely to be. Clear information about what 'smart charging' means should be included, i.e. will it reduce the level of charge or pause it?

It is important that the key message delivered by the leaflet highlights the advantages that smart charging could offer householders. If possible, potential bill savings should be clearly defined rather than mentioned as a possible abstract advantage. This is as opposed to concentrating on negative consequences of not implementing smart charging, such as increased bills or having to dig up roads to upgrade equipment. Focusing on such consequences could be perceived as threats.

The messaging strategy should make clear that smart charging is not a tactic to avoid investing in the electricity network. Instead, communications should also highlight other investment programmes to re-assure householders that the electricity network is actively being upgraded to manage expected changes in household energy use and explain how managed charging fits into this mix.

The leaflet should include a 'Frequently Asked Questions' section. This provides an excellent segment to include information that wouldn't normally be included in the main text of a leaflet. It is easily accessible to the reader who can pick out the information of most interest to themselves. What else is SSEN doing to 'future-proof' the local electricity network?

The information provided in the FAQ section can also be included in the body text of the leaflet, however by providing the information in the FAQ section it is easier to find and understand.

This section identifies the key messages that the DNO should communicate to its customers as a means of introducing the concept of smart charging. The messages are aligned to the suggested content headings in e.g. a communications leaflet:

- *Who is the DNO?*
The role of the DNO overall, particularly to differentiate it from an electricity supplier, the two roles being commonly misunderstood
- *The need for smart charging*
Meeting the electricity needs of the future: EVs are on the increase and the impact of clusters of EVs on local electricity networks will need some form of management; traditional reinforcement of underground cables is costly and disruptive; smart charging is an ideal and proven solution that avoids or defers reinforcement
- *The role that DNOs play in facilitating EVs on their networks*
DNOs are working ahead of need to support mass adoption of EVs in the UK
- *The customer benefits of smart charging*
The benefits of smart charging, for both EV and non-EV drivers: smart charging has the potential to keep customer bills from increasing in the future. Smart charging is a simple yet effective solution
- *How smart charging works – and customer impact*
Clusters of EVs will need to be managed to avoid power outages; a smart EV charger can be managed remotely, but only very infrequently, and with minimum or zero impact on the ability of an EV driver to get to their destination
- *Next steps*
Customers can take steps themselves to manage demand from EVs on the local electricity network.

The base content is tailored to EV and non-EV audiences where appropriate in sections 4.3.1 – 4.3.6.

4.3.1 Who is the DNO?

Recommended base content:

Who is Scottish and Southern Electricity Networks?

We're responsible for maintaining the electricity networks supplying over 3.7 million homes and businesses across central Southern England and North of the central belt of Scotland.

Our first priority is to deliver a safe, reliable supply of electricity from the national grid to the communities we serve in Scotland and England through our network of overhead lines, underground cables and substations. You may not have heard of us before, as you normally only need to contact us if you have a power cut.

4.3.2 The need for smart charging

Recommended base content:

Meeting the electricity needs of the future

Forecasts predict around 40 million electric vehicles (EVs) will be on UK roads by 2050. Our electricity networks were not designed to charge EVs and although the networks can cope with some charging, it will cost several billion pounds to upgrade them so they are fit for the future.

The cost of upgrading the network to meet this demand will mean higher bills for customers. So, we are trialling smarter, more affordable ways of using the existing network which will help to keep down bills for our electricity customers in the future.

4.3.3 The role that DNOs play in facilitating EVs on their networks

Recommended base content:

What are we doing?

It is our job to plan for the future to make sure that your electricity networks can cope with EV charging. As a network operator – as distinct from an energy supplier – we have an obligation to make sure that your local electricity distribution network can cope with the forecasted uptake in EVs – so that EV drivers and their neighbours are not inconvenienced by any work that may be required to reinforce their local electricity distribution cables as a result of increased EV charging at times of high demand.

Therefore we are supportive of managed charging, otherwise known as ‘smart’ charging, which will provide EV drivers with greater functionality, and enable charging to be managed at peak times. This will help to allow convenient, cost-effective and efficient mass charging of EVs.

Smart charging is one of a range of solutions currently being trialled to ensure it is cost-effective and rapidly deployable, and it goes hand in hand with investment already being made to future-proof the network. We are working ahead of need to support mass adoption of EVs in the UK.

4.3.4 The customer benefits of smart charging

Recommended base content for an EV driver audience:

How will I benefit?

As an EV driver, you will already be enjoying the many advantages of driving an EV, including:

- **Lower running costs**
- **A unique driving experience**
- **Improved air quality and so ultimately better health outcomes**
- **Lower CO₂ emissions**

Smart charging has the potential to help keep customer bills down in the future, if network reinforcement can be avoided with a simple yet effective solution. Reinforcement may be necessary in some cases to facilitate EV uptake – but if we can plan for it in a timely fashion, significant cost savings will be made.

Recommended base content for a non-EV driver audience:

How will I benefit?

If you are not yet an EV driver/owner, you may know that EVs – both pure electric vehicles and plug-in hybrids – are on the increase, with prices coming down, range of vehicles increasing and the second-hand market for EVs starting to emerge. This is great news for consumers, as it means:

- **More vehicle choice**
- **Lower running costs**

- **A unique driving experience**
- **Improved air quality and so ultimately better health outcomes**
- **Lower CO₂ emissions**

Smart charging has the potential to help keep customer bills down in the future, if network reinforcement can be avoided with a simple yet effective solution. Reinforcement may be necessary in some cases to facilitate EV uptake – but if we can plan for it in a timely fashion, significant cost savings will be made.

4.3.5 How smart charging works and customer impact

Recommended base content:

How does smart charging work?

Smart charging means using an EV charger that has the technical functionality to enable it to be remotely managed, i.e. the charging rate ramped up or down – in cases of electricity network need. Research has shown that typically when more than 40% of people have EVs, who are living within one or two streets of one another, the charging of those EVs may need to be managed to avoid power outages in the rare instances when a number of the EVs are charging at once.

Technology is being developed that will enable us to manage an EV's charge rate on the infrequent occasions – possibly just a few times each year - when it would otherwise mean that a substation fuse is blown. Apart from you experiencing a power cut, this can trigger a costly and disruptive (i.e. 'roads being dug up') reinforcement event.

SSEN guarantee that managing a customer's EV charging will only be done when absolutely necessary to avoid a power outage.

Research is showing that it is very unlikely to impact on an EV driver's ability to get to where they need to travel the next day.

4.3.6 Next steps

Recommended base content for the EV driver:

Next steps?

Please keep this leaflet for your reference. If you already drive an electric car, then you can do your bit to help manage the load. Just follow these three simple suggestions:

1. Use the functions in the car to switch on charging after midnight to avoid the 'tea-time peak'.
2. Charge your car during the day, if feasible, rather than in the evening.
3. Ask your electricity supplier about 'time of use' tariffs, which could help lower your bills as well as the load on the grid.

Recommended base content for the non-EV driver:

Next steps?

Please keep this leaflet for your reference. If you are considering buying an electric car, then you can do your bit to help manage the load. Just follow these three simple suggestions:

1. Avoid the 'tea-time peak' and set your car to charge after midnight.
2. Charge your car during the day, if feasible, rather than in the evening.
3. Ask your electricity supplier about 'time of use' tariffs, which could help lower your bills as well as the load on the grid.

4.3.7 Frequently Asked Questions

How will smart charging affect me?

Each instance of smart charging will likely only last between 10-20 minutes. It is expected that managed charging would occur on no more than a few days each year. Charging will not be stopped, rather it would be ramped down (so instead of charging at 7kW it may reduce to 6kW, for example, for a short time), dependent on the demand on your street at that time.

So if an EV is being charged for a number of hours overnight, and charging was managed for 10-20 minutes within this period, the EV owner is still likely to have a full charge the next morning.

Smart charging will enable more people to charge their EVs using the existing local electricity network. It is not likely to hinder your next EV journey.

Why are you telling me this – is it a legislative requirement?

UK Government is seeking to mandate smart charging by 2020. We want to make sure that we, and you, are prepared for this eventuality. It's our responsibility to make you aware of any action we are taking to prepare your local electricity network for a sustainable future and how that might affect you.

What else are you doing to meet the electricity needs of the future?

SSEN has a portfolio of innovation projects, which are geared towards a sustainable and resilient electricity network of the future. See www.ssen.co.uk/Innovation for details of some of these projects.

4.4 Methods and frequency of communication

This section draws on the findings of the Engaged Customer Panels (ECPs).

4.4.1 Recommended communications medium

A professionally designed two-page A4 or A5 leaflet is recommended. This format offers the customer adequate information for engagement purposes, whilst not overwhelming them with material that is too lengthy to digest.

4.4.2 Delivery options

There are a number of delivery options that can be used in combination to maximise communications reach, for example:

- By post: Proven to be effective and a key recommendation from the ECPs

- By email: Direct and accessible to many customers; risk of being received as 'junk' mail
- DNO website: Online access to the leaflet is recommended as it offers the advantage of being able to disseminate links to the online version via social media, newsletters, etc.
- DNO newsletters: Link to the leaflet or use as a case study / news article in DNO newsletters to its customer base
- Online forums: DNO engagement with EV online forums is recommended as a means by which to reach EV drivers; the link to the leaflet can be disseminated this way
- Social media: Link to the online leaflet can be circulated via the DNO's social media channels
- Specialist car magazines
- Text message: With a link to download the leaflet
- DNO call centre: Call centre staff should be made aware as and when the leaflet is sent out, and be issued with a brief about smart charging and the content of the leaflet – and where to signpost for further information

4.4.3 Use of imagery and look of leaflet

Feedback from the ECP provided a clear guide towards the look of the leaflet. The panels recommended that the communications should be designed so that it doesn't have the look or feel of a sales brochure, especially being careful to avoid confusion with marketing material from energy suppliers or car sales garages.

A clear preference was shown by the panels towards imagery with a family on it.

Any imagery chosen for the campaign should avoid appearing staged or idealised and try to appear realistic.

4.4.4 'Smart Charging' or 'Managed Charging'

It is recommended that all messaging material use the same phrase to describe smart charging. This is to avoid unnecessary confusion.

It is recommended that the phrase 'smart charging' be adopted rather than 'managed charging'. 'Smart charging' has more modern, forward looking connotations whilst many people distrust being 'managed' and therefore will be more sceptical of the scheme.

4.5 Campaign logistics

4.5.1 Campaign length and timing

A longitudinal communications campaign¹ would benefit the significant volume of customers that are expected to purchase and drive EVs in the years leading up to the proposed ban on new diesel and petrol vehicles in GB.

A key issue is in proactively identifying networks that have limited remaining capacity and are therefore at risk of being operated over capacity. DNOs will use modelling techniques to initially identify low voltage (LV) areas most at risk. There is also the prospect of using demographic analyses to estimate where EV uptake is likely to be clustered.

Areas identified as part of planning work as being close to capacity limits would be prioritised for fast-track roll-out of LV feeder monitoring to gain a firmer understanding of peak demand. Estimates

¹ A longitudinal study is a campaign design that involves repeated phases of activity over an extended period of time.

of spare capacity would be cross-referenced with EV uptake predictions to attempt to identify the timeframe within which network assets face risk of overload.

Where a timeframe is identified and smart charging deployment is planned in geographical clusters of the electricity network, a customer communications campaign could be targeted at relevant customers. This would ensure that messages are directed only at customers who are likely to be impacted. The campaign would seek to raise awareness of smart charging and utilise the messages tested in the Smart EV project to gain customer acceptance.

4.5.2 Campaign monitoring

It would be prudent to measure the extent to which the communications campaign has influenced the attitudes and behaviours of those within the target audience who have observed the campaign through market research.

During the course of the campaign a range of macro-environmental factors may also influence campaign outcomes. The macro-environment refers to all forces that are part of larger society and affect the micro-environment, including but not limited to social, technological, economic, environmental and political developments.

Measurement of the campaign's effectiveness over time would allow for campaign messages to be refined and reflect changes in customers' attitudes and behaviour towards smart charging.

4.6 Recommendations

Key recommendations

1. EV demand management messages should be tailored respectively to existing EV owners and customers considering buying an EV.
2. The design of the front cover of the customer information leaflet is critical to reading rates.
3. The relationship between DNOs (as distinct from energy suppliers) must be explained clearly to customers.
4. Reference to Government forecasts in literature should be updated to reflect recent Government announcements or changes in policy.
5. It is important to clarify the likely frequency and duration of smart charging events as part of the Customer Messaging Strategy.
6. Smart charging should be positioned as one of myriad techniques being utilised to manage impacts on electricity networks, and as being complimentary to ongoing investment into the network to safeguard network resilience.
7. Customers should be advised to ask their electricity supplier about time-of-use tariffs, which could help lower their bills as well as the load on the grid.
8. Multiple communication channels should be adopted to communicate key messages in print and digital formats.
9. DNOs are well positioned to communicate key messages and target them at customers likely to be affected.
10. The effectiveness of the customer communication strategy should be monitored as part of a longitudinal study to ensure that the executed strategy is adaptive to the changing environment.

Appendix I Engaged Customer Panel Report

Engaged Customer Panel Methodology

Overall objectives of the ECP

The key research objectives of the ECP were to evaluate and refine customer communication materials to be used to support demand side response and demand control of EVs:

- To determine the materials' effectiveness and clarity in explaining the project and potential network charging options
- To explore the acceptability to customers of the proposed demand control of EVs, including how concerns may be alleviated through optimisation of communications materials.

The customer engagement method designed to meet the research objectives for this project is set out in section 2 of the [Smart EV Customer Engagement Plan](#) (version 2.1).

Addressing the objectives of the ECP

The research objectives were exploratory in nature and required a methodology that elicited deeper understanding of customers' experiences, attitudes and behaviours in using EVs, and enabled the co-creation and refinement of communication materials for a Customer Messaging Strategy.

Focus groups are proven to be a suitable ECP platform to explore complex concepts and encourage informed discussions, and were seen as an appropriate mechanism for this research activity.

An ECP comprising two distinct customer groups was convened, and met on two separate occasions in June and July 2017. The ECP was represented by domestic customers in Scottish and Southern Electricity Networks' two distinct operating regions: Central Scotland and Central Southern England.

The ECP was convened using an online research methodology. The benefits of this approach primarily meant that participants were not required to travel to a central location, consequently enabling a much higher volume of customers to access the research activity. To participate, online participants needed to own their own computer device such as a laptop with an in-built webcam so they could observe a live feed of the focus group and see other participants. They also needed to have access to a telephone so they could dial a Freephone telephone number, listen in and contribute towards the live discussion. Contact was made with all participants by email and phone prior to the focus group to ensure everything had been set up correctly on their preferred devices.

During the ECP, a professional independent moderator asked participants semi-structured questions relating to a predefined list of topics. During these meetings, information was evaluated by the participants, who were encouraged to provide feedback and share their unique experience in relation to the discussion topics. This format allowed the moderator the flexibility to question participants further on issues arising from open discussion. It also encouraged the natural evolution of the ECP's understanding of the role and responsibility of Scottish and Southern Electricity Networks, the problem statement, the possible solution and the overall benefits of the proposed solution.

The iterative approach adopted allowed the project team to develop, test and evaluate communication materials to support the development of the Customer Messaging Strategy.

Reconvened meetings

The focus areas of the two scheduled meetings are outlined in Figure I:

Figure I: ECP meetings

ECP meeting	Research objectives
ECP meeting 1	<ul style="list-style-type: none"> Introduce Scottish and Southern Electricity Networks, its role as a DNO in the electricity industry and its relationship to National Grid and suppliers. Establish customers' ownership and usage of EVs. Evaluate understanding of the Climate Change Act 2008 and the implications of the increased electrification of transport upon local electricity distribution networks. Test understanding, credibility and acceptance of smart charging. Deliberate upon the effectiveness of draft communication materials in explaining smart charging, and identify customers' preferred messages.
ECP meeting 2	<ul style="list-style-type: none"> Evaluate the effectiveness of refined customer communication materials including a leaflet targeted at EV owners, an alternative targeted at customers considering buying an EV and three potential front covers for each leaflet variant. Explore the most appropriate communication channels for communicating Smart EV messages.

The initial round of ECP meetings for each of the customer groups included an introduction to Scottish and Southern Electricity Networks, ensuring that the role of the DNO within the electricity sector was understood. It then introduced relevant briefing information in the form of a problem statement regarding the impact that localised clustering of EVs is likely to have on electricity networks. Supplementary educational materials to inform the focus group debate were also presented to the ECP. This led to the examination of the proposed smart charging solution, explained through a customer leaflet.

The second round of focus group meetings was designed to elicit a more detailed understanding of customers' perceptions of draft communication materials. In the time between the two ECP meetings, a refined customer leaflet was developed, based on feedback in the previous session.

The learning outcomes from the reconvened ECP meetings are documented in section 4.

Membership of the ECP

The ECP comprised two separate focus groups, each one representing a key geographical customer segment.

Ten individuals were recruited to participate in each of the two key customer ECP subgroups. Recruitment was on the basis that participants would attend both scheduled meetings.

The ECP were recruited to reflect a demographic profile attuned to the age, gender, social grade and household composition of existing EV owners.

Screening criteria were established to ensure that all participants were:

- Owners of either a plug-in hybrid electric vehicle (PHEV) or a battery electric vehicle (BEV)
- Driving their vehicle at least once or twice a week.

Frequency of meetings and attendance

Each ECP met on two separate occasions (see Figure II). The meetings lasted approximately 120 minutes each and were facilitated by an accredited Interviewer Quality Control Scheme moderator.

Figure II: ECP meeting dates

Meeting	Region	Date
ECP meeting 1a	Central Southern England	28 June 2017
ECP meeting 1b	Central Scotland	29 June 2017
ECP meeting 2a	Central Southern England	26 July 2017
ECP meeting 2b	Central Scotland	27 July 2017

ECP participants were expected to attend both meetings, and to ensure this they were advised of the dates prior to committing to take part.

A target attendance level of at least eight participants was set for each meeting. Based on previous customer engagement, it was anticipated that the attrition rate of participants who no longer wished to take part would be approximately 10% (or one person) between the two meetings. Recruiting ten customers allowed sufficient mitigation for non-attendance.

The minimum attendance of eight people per group was achieved on all occasions, as set out in

Figure III: ECP attendance

ECP meeting	Attendance
ECP meeting 1a	9/10
ECP meeting 1b	9/10
ECP meeting 2a	8/10
ECP meeting 2b	9/10

Administrative support and facilitation

The ECP research was conducted by Impact Utilities, an independent market research agency, on behalf of Scottish and Southern Electricity Networks. All research was carried out in accordance with the professional standards set out in the Market Research Society Code of Conduct.

Impact Utilities was responsible for the day-to-day management of the ECP, associated arrangements and moderating the group discussions. It was also responsible for the provision of analysis and documentation of the findings.

Incentivisation

Participants were offered a payment of £150 in the form of an e-voucher or cheque for attending the two meetings, where £50 was awarded after the first meeting and the remaining £100 upon successful completion of the second meeting. This tiered payment was recommended by Impact Utilities based on previous experience of recruiting customers to take part in similar multi-session panels. Customers were required to sign a claim form to document receipt of the payments, and could elect to make an equivalent donation to a registered charity of their choice if they preferred.

ECP vehicle ownership and behaviour

The main contributory factors in the panel's early adoption of EVs were:

- Environmental benefits such as zero emissions

- Improved driving experience compared to petrol or diesel vehicles as a result of enhanced power and reduced audio impact
- Reduced maintenance, running costs and tax efficiencies
- Opportunity for vehicle-to-grid (V2G) to sell demand side response services by either returning electricity to the grid or by throttling the charging rate.

Participants reported being aware of their driving behaviour having changed since adoption, referencing greater advance planning for their journeys. This change was primarily driven by concerns about the availability of public charging stations, thereby making it more challenging to charge vehicles on demand at short notice.

Benefits of EV demand management

Overall, the ECP were accepting and supportive of smart charging, primarily due to the impact of potential disruption being perceived as negligible. The panel questioned why smart charging had not already been implemented.

Participants concluded that there were obvious benefits for DNOs in implementing smart charging and fewer tangible benefits to end consumers:

"The leaflet says 'how will I benefit?' Yet it doesn't tell me how I benefit at all. It just says that it saves the network money, which might come through to my bill." Male participant, Central Southern England.

A quick poll administered within the focus group confirmed that the majority-held view was that the Smart EV Customer Messaging Strategy needed to focus more on the benefits of smart charging to existing owners of EVs.

"In terms of the benefits of EV smart charging, this leaflet is aimed at people who've got electric vehicles, yet it still has a sales pitch in there talking about why you should want to own an electric vehicle, so that seems to be superfluous." Female participant, Central Southern England.

The panel appreciated that capital investments would be carbon-intensive and would lead to customer impacts such as traffic disruption. The implication that deferment of traditional reinforcement would defer traffic disruption and would assist in keeping energy bills down was appealing to some:

"Especially where it says 'reduce your bills'. If this will actually happen, then that would be a big positive for me." Female participant, Central Southern England.

However, reference to fuel bills, including distribution use of system charges, led to some expressions of distrust towards the energy sector, as participants perceived suppliers to be making large profits and not passing on cost efficiencies to consumers. The implication of this inherent cynicism meant that participants expressed a wish for further clarity regarding potential bill savings:

"In the future, smart charging could reduce your bills, but it doesn't say how much by, and you're asking people to make that sacrifice now with the disruption to their service without any guaranteed incentive or payback." Male participant, Central Southern England.

The Central Southern England panel was more attuned than its Central Scotland counterpart to the view that smart charging represents a reduction in service to customers:

"The trouble is, it is a service reduction and quite a negative message. It's all about if we don't act now, we're going to have to dig up the roads and put money on your bills. We want to be able to drop off your charging for 15 minutes to protect our network. So it's very much about taking something away." Male participant, Central Southern England.

The perceived detriment in service caused by smart charging represents a barrier to acceptance and necessitates that the Smart EV messaging campaign focus more on positive messages such as incentives to change behaviour, for example time-of-use energy tariffs. The customer leaflet included a call to action, encouraging customers to ask their electricity supplier about time-of-use tariffs, which could help lower their bills as well as the load on the grid. This incentive was considered to be a relevant benefit:

"You could cut out large parts of the leaflet and leave that bit at the end about tariffs, because that's relevant to me." Male participant, Central Southern England.

Relevance of EV demand management

The definitive measure of supply reliability² is the expectation of constant availability, namely a continuous, uninterrupted supply of electricity and a guarantee that power will always be available when customers 'flick a switch'. Customers' sensitivity to changes in supply reliability underlies the relevance of EV demand management and the importance of communicating about the technique in a manner that reassures rather than poses a threat:

"It's quite an emotive statement. Nobody's engaged by threats." Male participant, Central Scotland.

Concerns were expressed regarding the inconvenience that managed charging could bring in specific household scenarios, and this was exacerbated by there being no reassurance in the draft communication materials regarding the anticipated frequency of managed charging applicable.

The expected duration of managed charging (10 to 12 minutes) was perceived to be acceptable. However, there was some uncertainty regarding whether smart charging constituted reducing the charge to a vehicle or pausing it, and indeed how the technique would work in principle:

"It says they're going to manage the charge, but it doesn't tell you how. 'Managed' is quite an abstract phrase that could mean anything, and it strikes me that what you're talking about doing is just pausing the charging in times of high need." Male participant, Central Scotland.

In contrast to the Central Southern England panel, members of the Central Scotland group suggested that smart charging does not appear to go far enough in its current format in solving the problem. Smart charging was perceived as a reactive solution to an emergency surge in electricity demand, and interest was expressed for a more proactive real-time 24/7 management of charging.

The relevance of EV demand management led to engaged and enthusiastic debate among panellists regarding possible solutions to mitigate the impact of smart charging on customers. Although it was considered to be impractical to warn customers in advance of a smart charging event, the panel believed that communication issued during the intervention would be beneficial to those affected. The panel thought that this form of acknowledgement could be delivered by text message to mobile phones of those who opt in to the service.

The ECP contemplated other means of incentivising behavioural change and recommended that the Smart EV messaging strategy should also make reference to the potential for V2G services:

"And I also don't see anything here which is showing the benefit that being able to access EV batteries on a vehicle-to-grid system would actually offer. So, it feels like you'd need to be more even-handed." Male participant, Central Scotland.

² <http://www.enwl.co.uk/docs/default-source/future-voll/voll-ecp-report.pdf?sfvrsn=2>.

Customer messaging materials

Q&A briefing document

In Scottish and Southern Electricity Networks' previous Second Tier Low Carbon Networks Fund projects, a key learning outcome was that in general, customers needed to comprehend its role and responsibilities as a DNO and how these differ from those of electricity generators and suppliers, before they were able to digest project awareness materials. The ECP was provided with a Q&A document (see SSEN Q&AII) to read before the first ECP meeting. The Q&A document gave an overview of Scottish and Southern Electricity Networks and differentiated it from suppliers and National Grid.

Prior to being educated, participants were largely unaware of the role of Scottish and Southern Electricity Networks as a DNO, and there was significantly more awareness of its dual role as an energy supplier:

"I've seen their vans around the place. I think I just assumed that they were an electricity company, the same as E.ON and British Gas and everyone else." Male participant, Central Scotland.

In response to the Q&A, the panel expressed surprise at the diverse range and volume of both DNOs and other organisations involved in delivering energy to GB customers:

"You only seem to take notice of the area where you live, which is your local distributor. I didn't realise there were so many. I thought maybe two or three. I didn't realise there were eight or nine." Male participant, Central Southern England.

The Q&A also asserted that a typical home in Scottish and Southern Electricity Networks' region will experience a power cut once every three years, and on average is without power for about an hour. The panel representing Central Scotland reported an inferior power quality compared to the reported average for all customers of the ECP:

"The only thing I did [was] break out laughing when it talked about the number of power cuts, because certainly we get power cuts every two weeks." Male participant, Central Scotland.

There was notably higher tolerance of unplanned supply interruptions by rural customers, who had greater experience of outages. While these customers expressed some grievance at paying the same as other customers for what they regarded as a diminished service, they tended to recognise that their supply was provided primarily by overhead lines, which are more susceptible to faults from weather and other external factors. They also considered the expectation of more frequent interruptions than town or city dwellers as an accepted price customers choosing to live in rural areas had to pay.

Information cards

The Climate Change Act 2008

Based on the learnings disseminated from other GB-wide innovation projects, the project team expected that the information provided (see Figure IV) would meet certain obstacles, such as customers' inability or general reluctance to accept the expected take-up of EVs and heat pumps. Customers have generally had limited exposure to low carbon technologies in their daily lives. Therefore they can find it difficult to make the connection between a reduction in fossil fuel usage and an increase in demand for electricity, along with the implications this may have for everyday functions such as heating and travel.

Figure IV: The Climate Change Act 2008 information card



CLIMATE CHANGE ACT 2008

The Climate Change Act 2008 asks the UK to reduce greenhouse gas emissions by 80% by 2050. This will mean that we have to burn fewer fossil fuels.

At the same time, the demand on electricity networks is expected to double because:

- Homes are likely to be heated by electricity instead of gas; and
- Cars will be electric rather than petrol fuelled.



Conversely, the Smart EV ECP was unanimous in its acceptance of the Climate Change Act 2008 and the resultant acceleration in the electrification of transport, linked to progressive policy, regulation and standards. As early adopters and enthusiasts of EVs themselves, members of the ECP felt confident regarding the likelihood of a significant increase in demand for electricity.

Furthermore, the panel suggested that the relatively passive observation that “the Climate Change Act 2008 *asks* [emphasis added] the UK to reduce greenhouse gas emissions by 80% by 2050” should be replaced with “the Climate Change Act 2008 *requires* the UK...” – owing to it being a mandated instruction. The panel also felt that the target of 2050 could be brought forward:

“I would like to think it would happen by 2030. Because 2050 is a long time away. There’s no reason why they can’t... the Government needs to get firmer on house builders, ensure they have to implement more solar panels, wind farms, get more renewable energy built in from the word go. And the more electricity we can create ourselves, the better.” Male participant, Central Scotland.

Importantly, the timing of the reconvened ECP was such that it coincided with an announcement from the UK Government that new diesel and petrol vehicles were to be banned from 2040.³ This strengthened the resolve of the observations made and perceptions held by the ECP and reaffirmed the credibility of the problem statement (see Appendix I - Problem statement), paving the way for consumers to accept a solution such as smart charging.

Although subsequent to this engagement with customers, it is relevant that at the time of drafting this report the Scottish Government announced that it will ‘phase out’ new petrol and diesel cars by 2032.⁴ Such announcements are becoming more commonplace, and have synchronicity with the ECP participants’ commonly held perception that there is a need for greater urgency.

Problem statement

An information card (see Figure V) explaining why demand for electricity is likely to significantly increase in the future was also presented to the ECP.

³ <http://www.bbc.co.uk/news/uk-40723581>.

⁴ <http://www.independent.co.uk/news/uk/politics/scotland-petrol-diesel-cars-phase-out-ban-2032-nicola-sturgeon-snp-environment-air-pollution-a7930781.html>.

Figure V: Problem statement information card



Scottish & Southern
Electricity Networks

Powering our
community

PROBLEM STATEMENT

Government forecasts predict around 40 million electric vehicles (EVs) on UK roads by 2050.

As electrification of transport becomes more widespread, localized clustering of demand is likely to have a greater impact on electricity networks. Research has shown that the additional demand from an EV is equivalent to an extra house on the network. This extra demand would mean approximately 30% of GB low voltage (LV) networks would require reinforcement by 2050, representing a present day cost of £2.2bn to UK customers.

Distribution Network Operators (DNOs) are under a regulatory obligation to make sure that local electricity distribution networks can facilitate the forecast uptake in EVs.

While it is imperative to continue to be aware of the need to educate participants before engaging them in group discussions, the context given should limit opportunity for wider debate on irrelevant topics, such as energy prices and cost implications for taxpayers, which can be distracting for some:

"The price will double, won't it? Supply and demand. They'll see more of a profit and they'll put the price up". Female participant, Central Southern England.

The ECP accepted Government forecasts regarding the uptake of electric vehicles by 2050 and the concept of widespread, localised clustering of EVs having a greater impact on electricity networks. The panel hypothesised that local electricity distribution networks could facilitate the forecast uptake in EVs through shifting demand for electricity away from the current daily peak:

"It can be done intelligently, so that the demand for EVs either locally, nationally or both is managed so that everybody's car doesn't start charging at the same time. If it's spread through the day and night, I think the impact will be less" Male participant, Central Scotland.

There was an implicit assumption among the panel that by 2050 the majority of electric vehicle charging will be conducted off-peak. This sentiment was echoed in both regions and linked to a demand for greater incentives for consumers to change their behaviour to better assist DNOs with balancing electricity supply and demand now:

"With smart meters, we've now got the option to have time-of-day tariff. So if it was cheaper for me to charge overnight, then I'd plug it in overnight rather than when I get in from work. So the ability to have multiple different rate tariffs throughout the day, rather than just cheap rate and peak rate, would probably incentivise most electric car drivers to plug in when it's cheaper." Male participant, Central Southern England.

The panel speculated that a shift in the demand curve for electricity will also go hand in hand with improvements in the efficiency of technology, such as those observed historically with LED lighting and heat pump systems.

The panel was more critical regarding the current perceived lack of publicly available charging infrastructure and cited the need for significant investment to keep pace with accelerated uptake of EVs:

"The Government needs to get its act together about public charging. Charging really needs to be in advance of new cars coming on the market. At the moment, it's lagging behind. It seems to be demand-driven; that the more cars there are, then okay, we'll start putting some more [chargers] in. We need to start putting the chargers in in order to drive demand." Male participant, Central Scotland.

A solution: smart charging

Smart charging was introduced to the panel through an additional information card (see Figure VI) and positioned as a simple solution to avoid costly and disruptive traditional reinforcement of LV electricity distribution networks.

Figure VI: Smart solution information card



A SOLUTION

There's a great opportunity to avoid costly and disruptive reinforcement if DNOs can 'work ahead of need' and put in place 'smart', or 'managed' charging.

A simple technology is being developed that will enable a DNO to manage an EV's charge on the infrequent occasions when it would otherwise mean that there's a power cut due to a fuse blowing on the LV network.

On infrequent occasions EVs may need to be managed by the DNO to avoid power outages when a number of those EVs are charging all at once at peak time. Each instance of managed charging would only last between 10-12 minutes, and so would be unlikely to effect the ability of the charger to complete its charging session.

The information attempted to qualify the risks associated with smart charging to customers by explaining that each instance of managed charging would only last between 10 and 12 minutes, and so would be unlikely to affect the ability of the EV to complete its charging session before it is needed.

On balance, the consensus among the ECP was that the anticipated frequency of managed charging was such that it would have little impact on their day-to-day activities and was therefore acceptable:

"I think that the chances of that happening, as it's written here, are only two or three times per year. Even if it happens, you can wait for 10, 12 minutes and then it will be over." Male participant, Central Scotland.

"I don't think it's a problem. Not if it's for ten minutes. You can't really grumble for ten minutes." Female participant, Central Southern England.

Some participants considered the worst-case scenario posed by smart charging: the possibility of not being able to drive their vehicle at their discretion. This was exacerbated in some instances by the type of vehicle owned and its range:

"On a BMW i3, that will give you a 30- to 40-mile range. You might have a journey to do in the evening. So essentially, from knowing how much charge you are going to have in an hour's top-up, you may lose that ability because a third party, the DNO, has shut your power off for 15 minutes because that corner of the network is hot." Male participant, Central Southern England.

The true impact of a possible network intervention, combined with the worst-case scenario of a vehicle being unable to complete its charging session before it is needed, is also likely to be influenced by a household's composition:

"I'd find it a problem because if I had worked all day and done quite a lot of miles, then come home and not be able to charge my car up and my children needed taking somewhere, to their swimming or any after-school club, and I wouldn't be able to get them there, then I'd be very annoyed". Female participant, Central Southern England.

Vehicle needs change over time. The implication of this is that it makes it difficult to predict the level of disruption that will be caused to specific individuals should a managed charging event occur. Households with access to alternative vehicles felt they were able to mitigate this eventuality, while others felt their current charging behaviour already alleviated this concern:

"It wouldn't be a problem for me because I've never really seen an issue with coming home and thinking, 'I've only got maybe 5% left in my battery, but I need to go out in an hour.' To be honest, I simply wouldn't let it get down to that." Male participant, Central Scotland.

Building upon the overall consensus of the ECP that smart charging is acceptable, it was mooted by some of the panel, particularly in Central Scotland, whether the concept did not go far enough in tackling the problem statement:

"I think this seems quite reasonable, having an interruption, but I'd be disappointed if this is as far as you go with things. I think the interventions could be more imaginative." Male participant, Central Scotland.

"What they should be proposing is something that actively manages when each individual car starts and finishes charging. If you can balance out the electricity demand more, then the cost of producing that smooth demand of electricity will be less." Male participant, Central Scotland.

The theme of active ongoing management as opposed to a perceived one-off emergency intervention attracted enthusiastic debate among the panel, who hypothesised the possibility of a more dynamic charging system that takes into consideration consumers' preferences:

"If I'm charging overnight, I don't care. I get in at six o'clock, I need it to be full at eight in the morning and what happens in between that, it doesn't matter to me. So, some interactive way, maybe you plug your car in at home and you say I would like my car to be at least whatever percent full and then you say I'll leave you to do the rest." Male participant, Central Scotland.

Another important observation among the panel was the desire for reassurance that the smart-charging concept is not a ploy to avoid investment where it is needed on the network:

"Obviously, they need to put the investment into the network to be able to forecast and implement the charging requirements that are likely to be needed. I wouldn't like to see it being used as a way of managing to restrict the investment that's necessary, so that they don't spend the money on the network that's necessary." Male participant, Central Scotland.

"It seems to be getting used as a way to avoid investment in the network." Male participant, Central Scotland.

The implication of this finding is the importance of discriminating between deferring and avoiding traditional reinforcement when describing the Smart EV concept to customers. It is also important to highlight existing and future network investment programmes in communication materials that assist in conditioning perceptions that network reliability is actively being future-proofed.

Customer leaflet (first draft)

The project team decided to draft a customer leaflet that could form part of a customer messaging strategy to reach relevant customers and disseminate key facts about smart charging cost-

effectively. Importantly, leaflets are accessible to a wide range of customers due to the possibility of distributing them through a range of digital and physical formats.

A number of key messages to customers were drawn from the work of projects such as My Electric Avenue and Smart EV. Table I summarises the messages that were presented to the customer focus groups.

Table I: Key messages to customers

#	Key messages	Origin/evidence base
1	<p>EVs – both pure electric vehicles and plug-in hybrids – are on the increase, with prices coming down, range increasing and the second-hand market for EVs starting to emerge. This is great news for consumers, because it means:</p> <ul style="list-style-type: none"> • More vehicle choice • Lower running costs • A better driving experience • Better air quality, and so ultimately better health outcomes • Lower CO₂ emissions • Economic opportunity (new jobs) through Government funding for new technology and product development. 	EV market
2	<p>DNOs – as distinct from energy suppliers – are under a regulatory obligation to make sure that our local electricity distribution networks can facilitate the forecast uptake in EVs – so that EV drivers and their neighbours are not inconvenienced by any unplanned work that may be required to reinforce their local underground electricity distribution cables as a result of EVs charging at times of high demand.</p>	DNOs
3	<p>Government forecasts predict around 40 million EVs on UK roads by 2050. As the electrification of transport becomes more widespread, localised clustering of demand is likely to have a greater impact on electricity networks. Research⁵ shows that the additional demand from an EV is equivalent to an extra house on the network. This extra demand would mean that approximately 30% of GB LV networks would require reinforcement by 2050, representing a present-day cost of £2.2 billion to UK customers.</p> <p>There is a great opportunity to avoid costly and disruptive reinforcement if DNOs can ‘work ahead of need’ and put in place a managed EV charging solution to avoid this.</p>	My Electric Avenue
4	<p>‘Smart’ or ‘managed’ charging will help the overall customer experience when it comes to either themselves or their neighbours owning and charging EVs. A simple technology is being developed that will enable a DNO to manage an EV’s charge on the infrequent occasions when it would otherwise mean that there’s a power cut due a fuse blowing on the LV network. It only takes one such event to trigger a costly and disruptive (roads being dug up) reinforcement event.</p>	Smart EV
5	<p>Managed charging has the potential to avoid increased customer bills in the future, if network reinforcement can be avoided with a simple yet effective solution. Reinforcement may be necessary in some cases to</p>	My Electric Avenue

⁵ My Electric Avenue: <http://myelectricavenue.info/>.

	facilitate EV uptake – but if DNOs can plan for it in a timely fashion, significant cost savings will be made.	
6	Smart EV modelling shows that when between 40% and 70% of people have EVs who are living within one or two streets of one another, a number of those EVs may need to be managed by the DNO to avoid power outages when a number of those EVs are charging all at once. Each instance of managed charging would only last between 10 to 20 minutes, and so would be unlikely to affect the ability of the charger to complete its charging session. Thus, if an EV is being charged for a number of hours overnight, and charging is managed for 10 to 20 minutes within this period, the owner is still likely to have a full charge by the next morning, and will not notice any difference.	Smart EV

Learning transferred from previous innovation projects has highlighted the need to distil the complexities of the project into a concise description, with a focus on the customer implications and benefits.

Three versions of the customer leaflet were introduced to participants during the first meeting of each focus group (see Appendix III). Each of the three leaflets included a different title, style, layout and front cover, as well as different graphics and subheadings.

In addition, one of the leaflets tested was more concise than both of the other leaflets, omitting more detailed information concerning how smart charging was likely to affect customers and what the benefits of the technique were likely to be.

The three leaflets contained stock information that answered the following questions:

- Who is Scottish and Southern Electricity Networks?
- Why are we doing this (finding a solution)?
- So, what is smart charging?
- Summary
- What next?

The order in which the stock content was presented across the three leaflets was rotated.

The panel was able to view each leaflet in isolation utilising the online focus group platform. The moderator controlled the flow of information to panellists and zoomed in on one section of the leaflet at a time, allowing participants the time to read the information and respond to questions.

Overall perception of the draft customer leaflet

Despite containing some important, understood, relevant and accepted messages, the communication materials presented to the ECP were perceived to have a relatively negative tone of voice, being ‘more stick than carrot’:

“The trouble with the whole leaflet you’re showing is this is the stick rather than the carrot. Maybe use the carrot to offer a better rate on the electricity linked to time of use. That’s my feel of the communication. It’s the wrong way round.” Male participant, Central Scotland.

The panel provided recommendations regarding the components of each communication piece that it felt should be refined in order to produce a significantly improved hybrid customer leaflet.

The panel also endorsed two variants of the leaflet being produced in order to enable more effective targeting of communication messages towards two distinct audiences: existing users of EVs and future users of EVs.

Key findings

The ECP agreed that the front cover of the leaflet needed to be designed in such a way as to prevent customers from immediately discarding it, and that this would be a major challenge. It was thought that the design needed to avoid any images or text that could be construed as 'junk' mail or information perceived by the customer to have no relevance to them. It was recognised that the front cover needed to clearly distinguish the leaflet from:

- Energy supplier sales-related information
- Other advertising and sales literature.

Participants were sure that unless the leaflet cover immediately struck them as important and, more specifically, relevant to their household, they were likely to discard it without reading or, at best, skim-read the content:

"It would probably go in the recycling." Female participant, Central Southern England.

There was an implicit assumption among the ECP that the information shared with them suggested that smart charging was the only solution being pursued by Scottish and Southern Electricity Networks to meet the anticipated increase in demand for electricity. This, combined with a relatively superficial awareness of the role and responsibilities of Scottish and Southern Electricity Networks and confusion regarding the proportion of the electricity bill apportioned to it, served to heighten scepticism regarding the problem statement and potential solution.

The implication of this finding is that it needed to be made clearer to the customers that smart charging was one of a myriad of initiatives being trialled to mitigate the problem statement, and that any solution would work alongside on-going business-as-usual investment into the electricity network. This reassurance could assist in dispelling the assumption that Scottish and Southern Electricity Networks is deferring investing in network assets out of self-interest.

In conceptual terms, the communication materials were perceived to lack clarity regarding how smart charging would work in practice – would it reduce the charge or pause it?

Customers also expressed curiosity as to what the benefits of the initiative were to them in the present day, given that they were a group of individuals who had already purchased EVs and therefore unlocked many of the benefits reported in the literature.

The panel was also surprised by what it perceived as the omission of any information relating to whether smart charging would be an opt-in initiative.

The ECP recommended that these key questions, among others, should be addressed through the inclusion of an FAQ section in revised communication materials.

Refinement of the information provided

In order to address the feedback received from the ECP, communication materials were refined so as to:

- Reference smart charging as being one of a myriad of new technologies and techniques being trialled by DNOs across Great Britain
- Emphasise the investment into network resilience currently being made by Scottish and Southern Electricity Networks and also that additional investment is planned for the future
- Alleviate concerns regarding the anticipated frequency of managed charging events, rather than focus on the likely duration
- Include a less defensive and more positive tone of voice

- Advise consumers to consider time-of-use energy tariffs as part of the 'next steps'
- Differentiate between the benefits of smart charging to current users of EVs and those applicable to prospective users
- Include an FAQ section designed to alleviate any concerns raised.

Customer leaflet (second draft)

Communication materials were optimised and then re-presented to the ECP (see Appendix III) in a second meeting where its members evaluated:

1. A leaflet specifically targeted at EV owners
2. A leaflet specifically targeted at customers considering buying an EV
3. Alternative front covers that could be applied to either leaflet 1 or 2.

A significant proportion of the words utilised in either leaflet were identical; however, the following additional text was included in the leaflet targeted at customers considering buying an EV:

- If you are not yet an EV driver/owner, you may know that EVs – both pure electric vehicles and plug-in hybrids – are on the increase, with prices coming down, the range of vehicles increasing and the second-hand market for EVs starting to emerge.

The title on both front covers also clearly delineated the intended recipients.

Overall perception of the improved customer leaflet

Despite smart charging being considered by the ECP to be acceptable to customers, the original leaflet tested was perceived as having a negative and threatening tone of voice that demonised drivers of EVs. By comparison, the revised customer leaflet was unanimously received very positively and described as clear, informative, pragmatic, straightforward, reassuring and approachable.

The change in the tone of the voice adopted in the literature enabled greater receptiveness towards the key messages being communicated, ultimately significantly enhancing the effectiveness of the communication materials.

The panel recommended some minor wording changes and highlighted other unanswered questions that could be addressed by making more detailed information available, where required, through alternative channels such as online.

Key findings

Subtle changes were made to the leaflet content that were intended to give the look and feel that it was tailored to a specific audience. Feedback from the ECP confirmed that this change had been noticed and assisted in improving the relevance of the leaflet:

"I think you've dropped the sales pitch about electric cars, which is quite useful. There was the whole section trying to promote cars in the middle of it last time, which just felt out of place and I don't see that here at first glance." Male participant, Central Southern England.

The ECP appraised the leaflet as being more informative than the original, linked to it having additional information in the form of an FAQ section:

"I really like the FAQ section because it explains everything in quite simple steps so you understand exactly what's likely to happen." Female participant, Central Southern England.

The FAQ section answered key questions that had been raised previously by participants, and consequently offered reassurance. The ECP particularly appreciated being made aware that Smart EV was one of a myriad of techniques being trialled to address the problem statement:

"I do like the last paragraph where it does say that they are looking into other solutions as well. It gives you the impression that they are working smartly rather than just passing the cost to us." Female participant, Central Southern England.

Some participants expressed an interest in knowing more about the other techniques being trialled, and surmised that this was likely a result of taking part in the ECP and thus being educated and engaged in the subject matter. The same level of engagement could not be reasonably expected of the wider customer base, and therefore it was suggested that additional information could be made available to those who require it through alternative channels such as online.

Customers' sensitivity to changes in supply reliability underlies the relevance of EV demand management, therefore additional information was included in the literature to qualify the likely impact on customers:

- Each instance of managed charging will only last between 10 and 20 minutes. Although it is impossible to give any guarantees, it is expected that no more than one instance of managed charging would occur during one evening/overnight period. It is also expected that managed charging would occur on no more than a few days each year.

The additional information had not been lost on participants, and it helped to distance the Smart EV technique from the worst-case scenario they had initially imagined:

"Yeah, I'm a bit more positive and optimistic about it because it's not going to be every night, it's not going to cause me as much of an issue as I initially thought." Female participant, Central Southern England.

"I think you've done a better job at rewording this to try and reassure people as to how often it would be." Male participant, Central Southern England.

Similar to the feedback observed in the ECP's first meeting, the revised leaflet attracted constructive criticism regarding the extent to which smart charging is a tangible benefit to individual customers:

"If smart charging isn't introduced, everybody's bills are going to have to go up, and if it is introduced, everybody's bills will stay the same or be thereabouts. There's no benefit in that. It's no more of a benefit to me as an electric vehicle owner than it is to anyone else." Male participant, Central Scotland.

This feedback was consistent across both of the ECP groups and with the response observed in the first meeting held with participants. The implication of this finding is that the suggestion that the adoption of smart charging may enable cost savings is not sufficiently motivating. However, monetary savings that can be obtained by individuals by opting for time-of-use-based tariffs were considered to be a tangible benefit.

Further to deliberating on the content, style, look and feel of the leaflet, the ECP was then asked to consider three alternative images for the front cover of the leaflet targeted at EV owners and to select their preferred option. Figure VII illustrates the three images and the preference expressed by the Central Southern England panel and the Central Scotland panel:

Figure VII: Front cover preference for the leaflet targeted at EV owners




	Option 1	Option 2	Option 3
			
% of the Central Southern England ECP selecting the front cover	25%	25%	50%
% of the Central Scotland ECP selecting the front cover	22%	67%	11%
Aggregated average	24%	47%	29%




Figure VII demonstrates that Option 2 was preferred in Central Scotland and Option 3 was preferred in Central Southern England.

The ECP was then asked to consider three alternative images for the front cover of the leaflet targeted at people considering buying an EV and to select their preferred option.

Figure VIII illustrates the three images and the preference expressed by the Central Southern England panel and the Central Scotland panel:

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Figure VIII: Front cover preference for the leaflet targeted at prospective EVs owners

	Option 1	Option 2	Option 3
			
% of the Central Southern England ECP selecting the front cover	33%	33%	33%
% of the Central Scotland ECP selecting the front cover	22%	56%	22%
Aggregated average	28%	44%	28%

Overall, the ECP's preference was to utilise the family-based image for both variants of the customer leaflet due to its broad appeal:

"Yeah, I think it's really that the photograph is much more engaging. It's a family group, a contemporary house, a reasonable-grade car, that sort of stuff. That's much more engaging." Male participant, Central Scotland.

Refinement of the information provided

Connected to the general interest among the ECP in time-of-use energy incentives, participants picked up on an inconsistency in the 'next steps' section of the leaflet where the advice to "avoid the tea-time peak and plug your car in to charge from 8pm onwards" appeared to directly contradict the instruction to "charge your car during the day, if feasible, rather than in the evening/overnight". The implication of this finding is that emphasis should be placed upon avoiding the tea-time peak and finding an energy tariff that incentivises this charging behaviour.

The ECP considered smart charging to be a credible and serious proposition, aided by the notion that it could be mandated by the Government. During the course of the research the Government announced in a plan published by the Department for Environment, Food & Rural Affairs (Defra) a ban on conventional petrol and diesel engines being sold from 2040. This announcement prompted the ECP to recommend that the timeframe referenced in the literature be changed from 2050 to 2040 or earlier:

"The timing probably ought to refer to the fact that there's been the announcements about the removal of petrol and diesel cars from the roads." Male participant, Central Scotland.

For prospective owners of EVs, the ECP identified an opportunity to clarify the process of obtaining a smart charging-enabled device within the leaflet:

"What I want to know is where is that EV charger coming from? Is that going to be at cost to the customer or are we going to be given it, are we going to have it installed by them?" Female participant, Central Scotland.

This question also raised a similar query regarding the legal and logistical challenges that may be encountered in enabling smart charging via existing chargers:

"I think the one thing that is missing there for this particular community and maybe the ones you are delivering to is what are you going to do about my current charging station?" Male participant, Central Southern England.

Taking into consideration participants' perspective relating to the potential for deployment of smart charging and what this means for their household, questions relating to the provision of technology and any associated retrofit should be considered as part of a future messaging strategy.

Communication of demand management

How to communicate EV demand management to customers

The ECP deliberated upon the various channels available for delivering key messages regarding smart charging to customers and considered:

- Post
- Email
- Online websites, forums and/or blogs
- Specialist car magazines
- Text message, with a link to downloading the leaflet
- Social media.

Traditional postal formats were top-of-mind:

"I must admit, I assumed you'd get it from your postman." Female participant, Central Southern England.

It was suggested that a mailshot could be administered to customers that have recently applied for an Office for Low Emission Vehicles (OLEV) charger grant.

"It is going to be for people who are going to get a brand-new car. I think it has got to be linked through with the OLEV money, so if you want to have a Government part-funded charging station then, you know, here's some information about it, but be aware it's going to have some technology in there that can allow some remote management and protect the network." Male participant, Central Scotland.

The ECP expressed concern that should the communication be delivered in isolation, it may be confused with other sales and marketing literature and consequently ignored.

Panellists hypothesised that enclosing the leaflet with their energy supply bill would mitigate this effect while also enabling greater reach and cost effectiveness in conveying the message to general customers:

"If it was through your electricity supplier and it's with a bill, you can't miss it. If it's through a postbox, it's possible you could have a look at it disinterested, and it goes in the bin. You're more likely to read it if it's physically in your bill." Male participant, Central Scotland.

The ECP was mindful of achieving the greatest reach and concluded that smart charging messages would need to be carried through the full range of available channels in order to reflect customer's needs and varied communication preferences.

Naturally this conversation prompted the ECP to contemplate which organisation(s) are best placed to communicate EV demand management to customers. The ECP thought that messages should be delivered by trusted organisations to avoid losing relevance and traction. For instance, vehicle retailers were regarded as having variable electric car knowledge, customer service credentials, ethics and standards, and therefore despite having access to a captive audience were considered to be an unsuitable communication channel.

The majority viewpoint held was that DNOs were best placed to communicate about EV demand management to customers:

"This leaflet is only talking about the infrastructure problems and it's only about smart charging to prevent the infrastructure from falling over. So it can only be SSEN [Scottish and Southern Electricity Networks] who spreads that message because it is their network that they're trying to protect." Male participant, Central Scotland.

It was acknowledged by the ECP that energy suppliers are well positioned to communicate with customers owing to them having an existing relationship with end customers. In the end, the ECP concluded that smart charging did not go far enough to dynamically manage their supply while rewarding them via appropriate incentives for providing a demand response to justify smart charging being communicated by energy suppliers:

"If it was smart chargers that intelligently switched on chargers through the night according to when demand was lower, then it could be a mixture of SSEN [Scottish and Southern Electricity Networks] and the electricity suppliers. But the leaflet is just to protect SSEN, so it has to be them who put the message out." Male participant, Central Scotland.

Conclusions

The final leaflet was considered by the ECP to offer the greatest potential to maximise the number of customers who would at least read the front cover and comprehend the principles of the Smart EV project.

The key conclusions from the ECP were as follows:

1. Early adopters of EVs understand the implications of the Climate Change Act 2008 and the electrification of transport on local distribution networks.
2. Customers accept smart charging despite it constituting a detriment in service.
3. Customers perceive the impact of smart charging events on them to be negligible.
4. Customers do not perceive any significant individual benefits from the adoption of smart charging.
5. Customers support in principle a more dynamic and active management of their charging providing appropriate incentivisation is available.
6. Customers have an interest in V2G-related services.
7. Customers are critical of the perceived lack of public charging infrastructure.

The ECP provided an essential forum for collecting constructive and independent feedback about initial drafts of the customer leaflet. The second phase of focus groups with the same participants was valuable for assessing their reaction to the changes made as a result of their earlier suggestions.

Although several learning outcomes from previous related projects were considered in the preparation for Smart EV customer engagement activities, new and unexpected findings emerged, emphasising the need for consultation with customers when developing awareness materials for each new project.

Appendix II SSEN Q&A Document



Scottish & Southern
Electricity Networks

Powering our
community

Questions & Answers

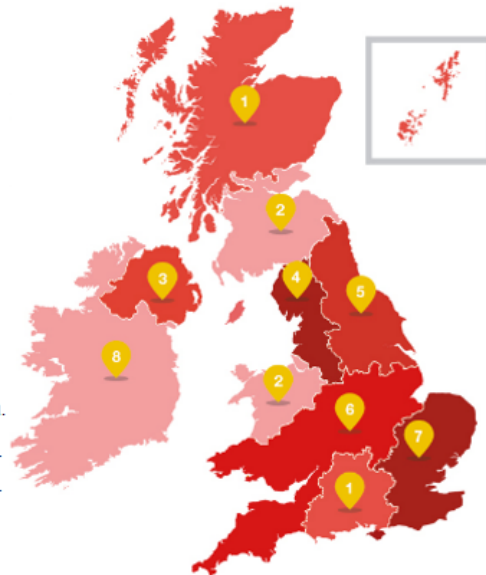
June 2017

Thank you for taking part in our customer consultation research

Who's who in the electricity industry?

There are many different types of companies and organisations involved in supplying you with electricity:

- **The National Grid** is responsible for operating some of the power lines in the UK – the most powerful ones – and transmitting electricity from power stations around the country closer to where people live and work. The National Grid is a little like the UK's motorway network.
- **Distribution network operators** – sometimes called DNOs – maintain many of the UK's electricity wires and cables. Each region of the UK has a DNO to maintain the electricity network in that area. Scottish and Southern Energy Networks (SSEN) is the distribution network operator – or DNO – for the region in which you live. The DNOs connect the National Grid's network to individual homes, offices, and other buildings – a little like the UK's 'A' and 'B' roads and local roads.
- **Suppliers** are the final step in the process and are the people who send you bills for your electricity such as EON, British Gas, EDF and Npower. Some of the money you pay to your supplier is passed to DNOs to cover their costs in supplying you with electricity.



Electricity Distribution



What does SSEN do?

- Scottish and Southern Electricity Networks forms part of the FTSE-50 energy company, SSE.
- Our electricity distribution and transmission networks carry electricity to over 3.7 million homes and businesses across the north of the Central Belt of Scotland and also Central Southern England.
- The network consists of overhead lines, underground cables, substations, transformers and other equipment.
- We are responsible for connecting your home or business to the electricity network, repairing the network when things go wrong and investing to replace worn out or old equipment.
- Scottish and Southern Energy's Network is 99.99% reliable. A typical home in our region will experience a power cut once every three years and, on average, is without power for about an hour. These figures are only averages – some homes will experience problems more often, while some homes and businesses will never have problems with their power supply.

130,000 km
of overhead lines
and underground
cables



3.7 million

We connect 3.7 million households and businesses to the National Grid.

106,000
substations



Why have I never heard of SSEN?

In many ways, SSEN is a 'behind the scenes' company. We don't send you a bill for our services. Instead, your supplier passes on part of what you pay them to us.

On average, around a fifth of a customer's total electricity bill is made up of electricity distribution costs, which, in our case, pay for the running, upgrade and maintenance of around 125,000km of power lines and underground cables and over 35,000 electricity substations.



Investing in your region

We are responsible for planning for the future and making sure the network can cope with any changes in how electricity is used.



Powering our
community

Why are we discussing SSEN?

There are a number of issues and challenges facing Scottish and Southern Energy Networks. As well as experts inside the company thinking about these issues, we want to get the views of our customers who live in the North of Scotland and Central southern England.

Part of our role as distribution network operator (DNO) is to plan for the future. In 2007 the UK government set challenging targets to protect the environment by making significant reductions in carbon emissions and reducing our reliance on fossil fuels like gas and oil. This means that demand for electricity in Great Britain is set to rise significantly.

This will present new challenges to DNOs who will need to invest heavily in new network infrastructure (overhead power lines, pylons, underground cables and substations) to meet the increased demand. This programme of work would lead to disruptive roadworks and power cuts and could lead to higher bills for customers in the near future.

To minimise potential costs, disruption and carbon emissions, we need to develop smarter and more efficient ways of managing our electricity networks.

SSEN is working hard to ensure its electricity networks can facilitate increasing numbers of low carbon technologies, such as electric vehicles (EVs). We need to ensure that local electricity networks are able to allow EV drivers to plug in and charge at home.

The innovative approach we are exploring in our customer consultation aims to keep electricity costs down for customers, reduce carbon emissions and help get the most from the existing network.



Appendix III Customer leaflets

Draft customer leaflet



Important information for electric vehicle owners: we are looking at options for adopting smart charging



Who is Scottish and Southern Electricity Networks?

We're responsible for maintaining the electricity networks supplying over 3.7 million homes and businesses across central Southern England and North of the central belt of Scotland. We own one electricity transmission network and two electricity distribution networks, comprising 106,000 substations and 130,000 km of overhead lines and underground cables across one third of the UK.

Our first priority is to provide a safe and reliable supply of electricity to the communities we serve in Scotland and England.

What are we doing?

We are working hard to make sure that your electricity networks can facilitate increasing numbers of low carbon technologies, such as electric vehicles (EVs). In the case of EVs, we need to ensure that local electricity networks are able to allow EV drivers to plug in and charge at home. As a network operator – as distinct from an energy supplier – we are under a regulatory obligation to make sure that your local electricity distribution networks can facilitate the forecasted uptake in EVs – so that EV drivers and their neighbours are not inconvenienced by any work that may be required to reinforce their local electricity distribution cables as a result of EV charging at times of high demand.

Therefore we are looking at introducing managed charging, otherwise known as 'smart' charging, which will provide EV drivers with greater functionality, and enable charging to be managed at peak times. This will help to allow convenient, cost-effective and efficient mass charging of EVs.

Why are we doing this?

Government forecasts predict around 40 million electric vehicles (EVs) on UK roads by 2050. As the electrification of transport becomes more widespread, localised clustering of demand is likely to have a greater impact on electricity networks. Research¹ shows that the additional demand from an EV is equivalent to an extra house on the network. This extra demand would mean approximately 30% of GB low voltage electricity networks would require reinforcement by 2050, representing a present day cost of £2.2bn to UK customers.

There's a great opportunity to avoid costly and disruptive reinforcement if we can 'work ahead of need' and put in place a managed EV charging solution to avoid this.

How will I benefit?

If you are an EV driver, you will already be enjoying the many advantages of driving an EV. If you are not yet an EV driver / owner, you may know that EVs – both pure electric vehicles and plug-in hybrids – are on the increase, with prices coming down, range increasing and the second-hand market for EVs starting to emerge. This is great news for consumers, as it means:

- **More vehicle choice**
- **Lower running costs**
- **A better driving experience**
- **Better air quality and so ultimately better health outcomes**
- **Lower CO₂ emissions**

Smart charging has the potential to avoid increased customer bills in the future, if network reinforcement can be avoided with a simple yet effective solution. Reinforcement may be necessary in some cases to facilitate EV uptake – but if we can plan for it in a timely fashion, significant cost savings will be made.

So, what is smart charging?

Smart charging means an EV charger that has the technical functionality within it to enable it to be remotely managed – in cases of electricity network need. Research has shown that when between 40 – 70% of people have EVs, who are

living within one or two streets of one another, the charging of a number of those EVs may need to be managed by the network operator to avoid power outages when a number of the EVs are charging all at once. A simple technology is being developed that will enable us to manage an EV's charge on the infrequent occasions when it would otherwise mean that a substation fuse is blown. It only takes one blown fuse to trigger a costly and disruptive (i.e. 'roads being dug up') reinforcement event. Managing a customer's EV charging will only be done when absolutely necessary to avoid a power outage.

Smart charging will help the overall customer experience when it comes to either you or your neighbours owning and charging an EV.

How will smart charging affect me?

Each instance of managed charging will only last between 10 – 20 minutes, and will be unlikely to affect the ability of the charger to complete its charging session. So if an EV is being charged for a number of hours overnight, and charging was managed for 10-20 minutes within this period, the EV owner is still likely to have a full charge the next morning.

Smart charging will help the electricity network and support uptake of EVs. It is not likely to hinder your next EV journey.

Top take-aways

- **Your local electricity network operator is working ahead of need to 'keep the lights on'**
- **We need to take action to facilitate increasing numbers of electric vehicles charging on our electricity networks**
- **Smart charging is cheaper and less disruptive than digging up the streets**
- **Smart charging is very unlikely to prevent you from making a journey**
- **Managing the charge will only be done when absolutely necessary**
- **In the future, smart charging could reduce your bills**

¹ My Electric Avenue: <http://myelectricavenue.info/>

What next?

Please keep this leaflet for your reference. If you already drive an electric car, then you can do your bit to help manage the load. Just follow these three simple suggestions:

- 1 Avoid the 'tea-time peak' and plug your car in to charge from 8pm onwards.**

- 2 Charge your car during the day, if feasible, rather than in the evening / overnight.**
- 3 Ask your electricity supplier about 'time of use' tariffs, which could help lower your bills as well as the load on the grid.**



SMART CHARGING FOR ELECTRIC VEHICLES: IMPORTANT INFORMATION FROM YOUR LOCAL ELECTRICITY NETWORK OPERATOR

WHO IS SCOTTISH AND SOUTHERN ELECTRICITY NETWORKS?

We're responsible for maintaining the electricity networks supplying over 3.7 million homes and businesses across central Southern England and North of the central belt of Scotland. We own one electricity transmission network and two electricity distribution networks, comprising 106,000 substations and 130,000 km of overhead lines and underground cables across one third of the UK.

Our first priority is to provide a safe and reliable supply of electricity to the communities we serve in Scotland and England.

WHAT ARE WE DOING?

We are working hard to make sure that your electricity networks can facilitate increasing numbers of low carbon technologies, such as electric vehicles (EVs). In the case of EVs, we need to ensure that local electricity networks are able to allow EV drivers to plug in and charge at home. As a network operator – as distinct from an energy supplier – we are under a regulatory obligation to make sure that your local electricity distribution networks can facilitate the forecasted uptake in EVs – so that EV drivers and their neighbours are not inconvenienced by any work that may be required to reinforce their local electricity distribution cables as a result of EV charging at times of high demand.

Therefore we are looking at introducing managed charging, otherwise known as 'smart' charging, which will provide EV drivers with greater functionality, and enable charging to be managed at peak times. This will help to allow convenient, cost-effective and efficient mass charging of EVs.

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There's a great opportunity to avoid costly and disruptive reinforcement if we can 'work ahead of need' and put in place a managed EV charging solution to avoid this.

HOW WILL I BENEFIT?

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- More vehicle choice
- Lower running costs
- A better driving experience
- Better air quality and so ultimately better health outcomes
- Lower CO₂ emissions

Smart charging has the potential to avoid increased customer bills in the future, if network reinforcement can be avoided with a simple yet effective solution. Reinforcement may be necessary in some cases to facilitate EV uptake – but if we can plan for it in a timely fashion, significant cost savings will be made.

SO, WHAT IS SMART CHARGING?

Smart charging means an EV charger that has the technical functionality within it to enable it to be remotely managed – in cases of electricity network need. Research has shown that when between 40 – 70% of people have EVs, who are

living within one or two streets of one another, the charging of a number of those EVs may need to be managed by the network operator to avoid power outages when a number of the EVs are charging all at once. A simple technology is being developed that will enable us to manage an EV's charge on the infrequent occasions when it would otherwise mean that a substation fuse is blown. It only takes one blown fuse to trigger a costly and disruptive (i.e. 'roads being dug up') reinforcement event. Managing a customer's EV charging will only be done when absolutely necessary to avoid a power outage.

Smart charging will help the overall customer experience when it comes to either you or your neighbours owning and charging an EV.

HOW WILL SMART CHARGING AFFECT ME?

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Smart charging will help the electricity network and support uptake of EVs. It is not likely to hinder your next EV journey.

TOP TAKE-AWAYS

- Your local electricity network operator is working ahead of need to 'keep the lights on'
- We need to take action to facilitate increasing numbers of electric vehicles charging on our electricity networks
- Smart charging is cheaper and less disruptive than digging up the streets
- Smart charging is very unlikely to prevent you from making a journey
- Managing the charge will only be done when absolutely necessary
- In the future, smart charging could reduce your bills

¹ My Electric Avenue: <http://myelectricavenue.info/>

WHAT NEXT?

Please keep this leaflet for your reference. If you already drive an electric car, then you can do your bit to help manage the load. Just follow these three simple suggestions:

1

Avoid the 'tea-time peak' and plug your car in to charge from 8pm onwards.

2

Charge your car during the day, if feasible, rather than in the evening / overnight.

3

Ask your electricity supplier about 'time of use' tariffs, which could help lower your bills as well as the load on the grid.



**We are
investing
in your smart
electricity future**

- **Your local electricity network operator is working ahead of need to 'keep the lights on'**
- **We need to take action to facilitate increasing numbers of electric vehicles charging on our electricity networks**
- **Smart charging is cheaper and less disruptive than digging up the streets**
- **Smart charging is very unlikely to prevent you from making a journey**
- **Managing the charge will only be done when absolutely necessary**
- **In the future, smart charging could reduce your bills**

Introducing the concept of smart charging

We are working hard to make sure that your electricity networks can facilitate increasing numbers of low carbon technologies, such as electric vehicles (EVs). In the case of EVs, we need to ensure that local electricity networks are able to allow EV drivers to plug in and charge at home. As a network operator – as distinct from an energy supplier – we are under a regulatory obligation to make sure that your local electricity distribution networks can facilitate the forecasted uptake in EVs – so that EV drivers and their neighbours are not inconvenienced by any work that may be required to reinforce their local electricity distribution cables as a result of EV charging at times of high demand.

Therefore we are looking at introducing managed charging, otherwise known as 'smart' charging, which will provide EV drivers with greater functionality, and enable charging to be managed at peak times. This will help to allow convenient, cost-effective and efficient mass charging of EVs.

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Refined customer leaflet

EV owners

Page 1



Home smart charging: information for electric vehicle owners

**Important information
from your electricity
network operator**



Who is Scottish and Southern Electricity Networks?

We're responsible for maintaining the electricity networks supplying over 3.7 million homes and businesses across central Southern England and North of the central belt of Scotland.

Our first priority is to deliver a safe, reliable supply of electricity from the national grid to the communities we serve in Scotland and England through our network of overhead lines, underground cables and substations. You may not have heard of us before, as you normally only need to contact us if you have a power cut.

Meeting the electricity needs of the future

Forecasts predict around 40 million electric vehicles (EVs) on UK roads by 2050. As the electrification of transport becomes more widespread, as well as the decarbonisation of heat, localised clustering of demand is likely to have a greater impact on electricity networks. Research shows

that the additional demand from an EV is equivalent to an extra house on the network. This extra demand would mean approximately 30% of GB low voltage electricity networks would require reinforcement by 2050, representing a present day cost of £2.2bn to UK customers.¹

The cost of upgrading the network to meet this demand will mean higher bills for customers. So we are trialling smarter, more affordable ways of using the existing network which will help to keep down bills for our electricity customers in the future.

What are we doing?

It is our job to plan for the future to make sure that your electricity networks can facilitate increasing numbers of low carbon technologies, such as electric vehicles (EVs). In the case of EVs, we need to ensure that local electricity networks are able to allow EV drivers to plug in and charge at home. As a network operator – as distinct from an energy supplier – we are under a regulatory obligation to make sure that your local electricity distribution networks can facilitate

¹ £2.2bn was calculated using the Transform model based on the My Electric Avenue project



Home smart charging: information for electric vehicle owners

Important information
from your electricity
network operator



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The cost of upgrading the network to meet this demand will mean higher bills for customers. So we are trialling smarter, more affordable ways of using the existing network which will help to keep down bills for our electricity customers in the future.

What are we doing?

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Home smart charging: information for electric vehicle owners

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¹ £2.2bn was calculated using the Transform model based on the My Electric Avenue project

the forecasted uptake in EVs – so that EV drivers and their neighbours are not inconvenienced by any work that may be required to reinforce their local electricity distribution cables as a result of increased EV charging at times of high demand.

Therefore we are supportive of managed charging, otherwise known as ‘smart’ charging, which will provide EV drivers with greater functionality, and enable charging to be managed at peak times. This will help to allow convenient, cost-effective and efficient mass charging of EVs.

Smart charging is one of a range of solutions currently being trialled to ensure it is cost-effective and rapidly deployable and it goes hand in hand with investment already being made to future-proof the network.

How will I benefit?

As an EV driver, you will already be enjoying the many advantages of driving an EV, including:

- **Lower running costs**
- **A better driving experience**
- **Improved air quality and so ultimately better health outcomes**
- **Lower CO₂ emissions**

Smart charging has the potential to help keep customer bills down in the future, if network reinforcement can be avoided with a simple yet effective solution. Reinforcement may be necessary in some cases to facilitate EV uptake – but if we can plan for it in a timely fashion, significant cost savings will be made.

How does smart charging work?

Smart charging means an EV charger that has the technical functionality within it to enable it to be remotely managed – in cases of electricity network need. Research has shown that when between 40-70% of people have EVs, who are living within one or two streets of one another, the charging of a number of those EVs may need to be managed to avoid power outages when a number of the EVs are charging all at once. Technology is being developed that will enable us to manage an EV's charge on the infrequent occasions – possibly just a few times each year - when it would otherwise mean that a substation fuse is blown. It only takes one blown fuse to trigger a costly and disruptive (i.e. ‘roads being dug up’) reinforcement event. Managing a customer's EV charging will only be done when absolutely necessary to avoid a power outage.

Next steps?

Please keep this leaflet for your reference. If you already drive an electric car, then you can do your bit to help manage the load. Just follow these three simple suggestions:

1. **Avoid the ‘tea-time peak’ and plug your car in to charge from 8pm onwards.**
2. **Charge your car during the day, if feasible, rather than in the evening / overnight.**
3. **Ask your electricity supplier about ‘time of use’ tariffs, which could help lower your bills as well as the load on the grid.**

FAQs

How will smart charging affect me?

Each instance of managed charging will only last between 10-20 minutes. Although it is impossible to give any guarantees, it is expected that no more than one instance of managed charging would occur during one evening/overnight period. It is also expected that managed charging would occur on no more than a few days each year.

So if an EV is being charged for a number of hours overnight, and charging was managed for 10-20 minutes within this period, the EV owner is still likely to have a full charge the next morning.

Smart charging will help the electricity network and support uptake of EVs. It is not likely to hinder your next EV journey.

Why are you telling me this – is it a legislative requirement?

UK Government is seeking to mandate smart charging by 2020. We want to make sure that we are prepared for this eventuality. It's our responsibility to make you aware of any action we are taking to prepare your local electricity network for a sustainable future and how that might affect you.

What else are you doing to meet the electricity needs of the future?

SSEN has a portfolio of innovation projects, which are geared towards a sustainable and resilient electricity network of the future. See www.ssen.co.uk/Innovation for details of some of these projects.

For further information and more FAQs visit www.websitetoocome.co.uk

Non-EV owners

Page 1



Home smart charging: information for people considering buying an electric vehicle

**Important information
from your electricity
network operator**



Who is Scottish and Southern Electricity Networks?

We're responsible for maintaining the electricity networks supplying over 3.7 million homes and businesses across central Southern England and North of the central belt of Scotland.

Our first priority is to deliver a safe, reliable supply of electricity from the national grid to the communities we serve in Scotland and England through our network of overhead lines, underground cables and substations. You may not have heard of us before, as you normally only need to contact us if you have a power cut.

Meeting the electricity needs of the future

Forecasts predict around 40 million electric vehicles (EVs) on UK roads by 2050. As the electrification of transport becomes more widespread, as well as the decarbonisation of heat, localised clustering of demand is likely to have a greater impact on electricity networks. Research shows that the additional demand from an EV is equivalent to an extra house on the network. This extra demand would mean

approximately 30% of GB low voltage electricity networks would require reinforcement by 2050, representing a present day cost of £2.2bn to UK customers.¹

The cost of upgrading the network to meet this demand will mean higher bills for customers. So we are trialling smarter, more affordable ways of using the existing network which will help to keep down bills for our electricity customers in the future.

What are we doing?

It is our job to plan for the future to make sure that your electricity networks can facilitate increasing numbers of low carbon technologies, such as electric vehicles (EVs). In the case of EVs, we need to ensure that local electricity networks are able to allow EV drivers to plug in and charge at home. As a network operator – as distinct from an energy supplier – we are under a regulatory obligation to make sure that your local electricity distribution networks can facilitate the forecasted uptake in EVs – so that EV drivers and their neighbours are not inconvenienced by any work that may be required to reinforce their local electricity distribution cables as a result of increased EV charging at times of high demand.

¹ £2.2bn was calculated using the Transform model based on the My Electric Avenue project



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Therefore we are supportive of managed charging, otherwise known as 'smart' charging, which will provide EV drivers with greater functionality, and enable charging to be managed at peak times. This will help to allow convenient, cost-effective and efficient mass charging of EVs.

Smart charging is one of a range of solutions currently being trialled to ensure it is cost-effective and rapidly deployable and it goes hand in hand with investment already being made to future-proof the network.

How will I benefit?

If you are not yet an EV driver/owner, you may know that EVs – both pure electric vehicles and plug-in hybrids – are on the increase, with prices coming down, range of vehicles increasing and the second-hand market for EVs starting to emerge. This is great news for consumers, as it means:

- **More vehicle choice**
- **Lower running costs**
- **A better driving experience**
- **Improved air quality and so ultimately better health outcomes**
- **Lower CO₂ emissions**

Smart charging has the potential to help keep customer bills down in the future, if network reinforcement can be avoided with a simple yet effective solution. Reinforcement may be necessary in some cases to facilitate EV uptake – but if we can plan for it in a timely fashion, significant cost savings will be made.

How does smart charging work?

Smart charging means an EV charger that has the technical functionality within it to enable it to be remotely managed – in cases of electricity network need. Research has shown that when between 40-70% of people have EVs, who are living within one or two streets of one another, the charging of a number of those EVs may need to be managed to avoid power outages when a number of the EVs are charging all at once. Technology is being developed that will enable us to manage an EV's charge on the infrequent occasions – possibly just a few times each year – when it would otherwise mean that a substation fuse is blown. It only takes one blown fuse to trigger a costly and disruptive (i.e. 'roads being dug up') reinforcement event. Managing a customer's EV charging will only be done when absolutely necessary to avoid a power outage.

Next steps?

Please keep this leaflet for your reference. If you are considering buying an electric car, then you can do your bit to help manage the load. Just follow these three simple suggestions:

- 1. Avoid the 'tea-time peak' and plug your car in to charge from 8pm onwards.**
- 2. Charge your car during the day, if feasible, rather than in the evening / overnight.**
- 3. Ask your electricity supplier about 'time of use' tariffs, which could help lower your bills as well as the load on the grid.**

FAQs

How will smart charging affect me?

Each instance of managed charging will only last between 10-20 minutes. Although it is impossible to give any guarantees, it is expected that no more than one instance of managed charging would occur during one evening/overnight period. It is also expected that managed charging would occur on no more than a few days each year.

So if an EV is being charged for a number of hours overnight, and charging was managed for 10-20 minutes within this period, the EV owner is still likely to have a full charge the next morning.

Smart charging will help the electricity network and support uptake of EVs. It is not likely to hinder your next EV journey.

Why are you telling me this – is it a legislative requirement?

UK Government is seeking to mandate smart charging by 2020. We want to make sure that we are prepared for this eventuality. It's our responsibility to make you aware of any action we are taking to prepare your local electricity network for a sustainable future and how that might affect you.

What else are you doing to meet the electricity needs of the future?

SSEN has a portfolio of innovation projects, which are geared towards a sustainable and resilient electricity network of the future. See www.ssen.co.uk/Innovation for details of some of these projects.

For further information and more FAQs visit www.websitetocome.co.uk

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