Date of Submission

July 2019

Project Closedown Report Document

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Project Title	**Project Reference**
Management of plug-in vehicle uptake on distribution networks	**NIA_SSEPD_0026**

Funding Licensee(s)	**Project Start Date**	**Project Duration**
Scottish and Southern Electricity Networks Power Distribution (Lead DNO) Western Power Distribution UK Power Networks Northern Powergrid Scottish Power Energy Networks Electricity North West	March 2016	31 Months

Nominated Project Contact(s)	**Year**
SSEN NIA Programme Delivery Manager –Joe McNeil	2019

Scope

This project will seek to inform an ENA Engineering Recommendation (or equivalent) for the connection, charging and control of new, large, PIV load to domestic properties. The focus of this project is on the collaborative approach required to achieve consensus on a solution that can be used to facilitate the roll out of controlled PIV charging. In doing so, it will enable significantly larger numbers of PIV charging on today's local electricity distribution networks, with sizeable reduction in reinforcement costs and customer bills/disruption.

The practical output will be a functional specification to describe the system, providing vendors with the information needed to build a trial system. Note that a detailed specification to allow full interoperability between vendors would be produced as a next step once the solution was successfully trialled and therefore lies outside the scope of this project. The output(s) will be achieved through:

- Desk-based research into existing national and international Protocols and Standards in the PIV space: specifically charging types and charging protocols either in development, in trial, or live. To investigate what is available, or in development today, with a view to establishing a preferred approach for a GB wide adoption.
- Dialogue with PIV manufacturers and charging point manufacturers to develop a roadmap of the likely vehicle charging requirements for different types of PIV (ideally 2015-2030+), including size (kW), battery capacity (kWh), likely charging location, etc.
- Develop an outline 'standard' for the connection and control of PIVs on distribution networks, together with options for deployment (e.g. Engineering Recommendation, Code of Practice, incentive mechanism, etc.)
- Test the outline 'standard' for the connection and control of PIVs on distribution networks with a broad audience, e.g. automotive community (Low CVP, OLEV, DfT, TfL etc.), Ofgem, ENA, IET and other stakeholders to be agreed, via consultation under the auspice of the Automotive-Utilities Working Group / other as identified. This will determine (a) the appropriateness of the outline standard, and (b) how the 'standard' should be deployed.
- Develop a communications strategy for enabling deployment. Customer Engagement Plan and Data Protection Strategy to be produced in support.
- Submission of material to the ENA, with endorsement by Automotive-Utilities Working Group to evidence industry and cross-sector support.
- Development of policy documents to validate the learning and facilitate embedding practices into the DNO for two use cases: restoration post fault / planned investment and management.

Completion of the foregoing tasks will enable the creation of an endorsed common solution for control of electric vehicle charging infrastructure giving a sizeable benefit to the DNOs and their customers.

Objective(s)

The principal objective of this project is to agree content to inform an Engineering Recommendation (or equivalent) with a number of influential stakeholders. Once agreed, the content can be passed to the ENA to endorse the agreed approach of managing PIV uptake on electricity distribution networks. The secondary objective will be to agree on the message and approach for communicating with the PIV buyer, the media and other key stakeholders

Success Criteria

The success criteria are defined as:

1. Industry accepted solution for managing PIV uptake on distribution networks that will avoid significant infrastructure costs or disruption
2. Industry accepted customer messaging strategy and recommendations for implementation

Performance Compared to the Original Project Aims, Objectives and Success Criteria

The project is aiming to solve a very relevant high-profile topic which is the subject of a great deal of public discussion. As such the approach has been to produce a comprehensive staged project plan:

1. Establishment of Steering Group containing representative stakeholders.

This objective has been fully met-a representative Steering Group has been established.

2. Technical Review

A full technical review was undertaken to allow the preparation of an options paper for presentation to the Steering Group.

3. Consultation Exercise

The Options Paper referred to above was endorsed by the Steering Group and was then advertised and circulated to all interested parties to obtain the widest possible responses.

4. Draft Engineering Recommendation Content

Following on from the Options Paper, work began on the draft engineering document content which would form the basis of a future ENA Engineering Recommendation.

5. Definition of Use Case

A document was produced which defined possible Use Cases presenting DNO and Supplier communities' various points of view.

6. Consultation Exercise 2

The responses to the initial consultation were used to shape a further consultation document. This was an extensive exercise due to the desire from the UK Energy to fully consider how the Smart Metering infrastructure could be used to manage potential network problems arising from the future deployment of EV's and other LCT technologies. UK Energy is the trade association for the GB energy industry with a membership of over 100 suppliers, generators, and stakeholders who have a business interest in the production and supply of electricity and gas for domestic and business consumers.

7. Customer Engagement-Messaging Strategy

At an early stage of the project, 3 sets of leaflets were prepared and used for discussion with 2 Customer Focus Groups, each comprising 8-10 consumers. Responses from both Focus Groups were used to prepare a set of Recommendations for future messaging as part of EV Strategy.

8. Finalise and submit Industry agreed material to ENA

This has been submitted to the ENA.

9. Integration into Business as Usual (BAU)

This aspect of the project has been removed due to wider discussion ongoing within the high-level stakeholders such as Ofgem/BEIS/Parliament regarding development of E V charging solutions.

Details of how the Project is investigating/solving the issue described in the NIA Project Registration Pro-forma. Details of how the Project is performing/performed relative to its aims, objectives and success criteria.

Required Modifications to the Planned Approach During the Course of the Project

During Stage 4/5 stakeholders representing ENERGY UK were very keen that the project should fully investigate the use of the Smart Metering infrastructure as a possible solution to the management of domestic EV charging. Undertaking the research to fully investigate the possibility of using this infrastructure involved widening the stakeholder group to include B.E.I.S (Department of Business, Energy and Industrial Strategy) and the Smart Energy Code. This widening of the project scope required greater engagement with the Regulator thereby increasing volume of work and increasing costs.

Consequently, the output of the project has now been modified to include a deliverable covering the use of the Smart Metering infrastructure to provide a longer-term solution.

The original intention to develop proposals for integration into BAU has been dropped from the project as there is extensive high level and Parliamentary interest in this area and until the direction of travel becomes clearer it would not be possible to develop a BAU strategy.

The Network Licensee should state any changes to its planned methodology and describe why the planned approach proved to be inappropriate.

Lessons Learnt for Future Projects

The retrospective broadening of the scope of the project suggests that a more widespread scoping exercise should have been undertaken prior to commencement to ensure all possible avenues were incorporated within the original project.
E V charging is a high-profile subject which will play a large part in the UK decarbonisation strategy. Due to major stakeholders such as Ofgem, BEIS and parliament being involved in the development of common strategies, it is difficult to predict the decisions and final solutions which will be implemented to manage E V charging. Hence, the integration of this project's outcomes into business as usual has been abandoned.

Recommendations on how the learning from the Project could be exploited further. This may include recommendations on what form of trialling will be required to move the Method to the next TRL. The Network Licensee should also state if the Project discovered significant problems with the trialled Methods. The Network Licensee should comment on the likelihood that the Method will be deployed on a large scale in future. The Network Licensee should discuss the effectiveness of any Research, Development or Demonstration undertaken.

The Outcomes of the Project

The project was successful in raising awareness that DNOs in partnership with suppliers have an essential role to play in the development of EV charging. In particular the necessity of DNOs to have an override control of E V charging in order to protect the low voltage distribution network from overload and possible fuse rupture has been acknowledged. This backstop arrangement should minimise customer interruptions.

It should be noted BEIS are presently consulting on proportional control of Smart EV charging using the Smart Metering network. This is a direct result of the issues raised and highlighted in this project and includes the provision of a DNO override.

It was also discovered during the research undertaken in stages 4/5 that under the Smart Energy Code only suppliers were authorised to control load via the Smart Metering Network.

With the understanding that DNOs require an override control a modification has been raised to the Smart Energy Code (SECMP0046) to allow DNOs to have this measured control of Electric Vehicle chargers connected to Smart Meter infrastructure. This modification is now progressing out with the project and should reach a conclusion in around 12/18 months.

Industry agreed material has been submitted to the ENA for use in an Engineering Recommendation. However, as with other aspects of this project, it is unclear to what extent it will be used in the development of the standard for SMART EV Charging due to the ongoing work by other parties including B.E.I.S., OLEV and the Low Carbon Vehicle Partnership.

The Automated and Electric Vehicle Act which became law in July 2018 mandated that EV Chargers shall be ''SMART'' without defining what functionality is required. It is likely that future OLEV grant aid for installing EV Chargers will be dependent on meeting the ''SMART'' requirement.

Regarding Messaging Strategy this was successfully explored, and valuable outcomes obtained as detailed in the SMART EV Customer Messaging Strategy report. This report can be accessed at https://www.eatechnology.com/engineering-projects/smart-ev/smart-ev-customer-messaging-strategy

When available, comprehensive details of the Project's outcomes are to be reported. Where quantitative data is available to describe these outcomes, it should be included in the report. Wherever possible, the performance improvement attributable to the Project should be described. If the TRL of the Method has changed as a result of the Project, this should be reported. The Network Licensee should highlight any opportunities for future Projects to develop learning further.

Data Access Details

No network or consumption data was gathered during this project. Data sharing requests can be made in accordance with SSEN NIC and NIA Data Sharing Procedure. Further details may be obtained by emailing futurenetworks@sse.com

A description of how any network or consumption data (anonymised where necessary) gathered in the course of the Project can be requested by interested parties. This requirement may be met by including a link to the publicly available data sharing policy.

Foreground IPR

No foreground IPR has been developed in this project.

A description of any foreground IPR that have been developed by the project and how this will be owned.

Planned Implementation

For various reasons described in the main text of the report it is not possible to predict the final solution which will be implemented to manage E V Charging nor the timescale for implementation.

This project has however been successful with respect to raising awareness around the necessity for DNOs to have an input to the chosen solution in order to protect the low voltage networks.

Other Comments

N/A

Standards Documents (Electricity projects only)

As covered in the main text a potential industry Draft Specification for Smart EV Charging was prepared and submitted to the Energy Networks Association. It is anticipated this document will be subject to ongoing review as part of the final nationally agreed solution for managed charging progresses.

This document was titled ''An interim solution for the management of residential Electric Vehicle Chargers to protect local electricity network assets''

Copies of this document can be obtained by contacting:

PMO

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