Energy Networks Innovation Process

Project Closedown Report Document

Date of Submission: 27/08/2021

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Project Title (*This cannot be changed once registered*) Local Electric Vehicle Energy Loop (LEVEL)	Project Reference NIA_SSEN_0046
Funding Licensee(s) Scottish Hydro Electric Power Distribution	Project Start Date April 2020
Project Duration 18 months	Year 2022
Nominated Project Contact(s) colin.mathieson@sse.com	

1. Scope

The project will capture benefits for GB as a whole, from both a network planning and local stakeholders' perspective.

2. Objective(s)

1 Identify detailed use cases for these mobile charge points which will include cases where there is a need to coordinate their connection and operation with constrained networks.
2 Develop a standard and specification for portable temporary EV chargers with key external stakeholders to assist with network resilience and meet short term demand.
3 Procure and demonstrate an agreed specification for portable EV charger.
4 Identify the challenges of providing short term access to the network for temporary EV charging, including any regulatory changes that would be required to facilitate it.
5 Develop a commercial ownership model including a cost benefits analysis to understand the viability of wider roll out and adoption.

3. Success Criteria

If the project delivers the anticipated learning to GB stakeholders, then it is deemed successful. If the project delivers a conclusion on the usefulness of portable temporary EV charging infrastructure and passes on the learning for future adoption then it is deemed successful.

4. Performance compared to the original project aims, objectives and success criteria

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.

Project background

Electric vehicles (EVs) and the supporting charging infrastructure are critical to delivering net zero ambition. Increased use of EVs requires greater resilience of the electricity network. This project is investigating the specification of temporary and portable EV charging infrastructure devices to provide additional capacity to meet short term demand in a location.

Project progress

Between April 2021 and September 2021, the following progress has been achieved against the listed activities.

1) Identify detailed use cases for these mobile charge points which will include cases where there is a need to coordinate their connection and operation with constrained networks. – this objective was completed in 2020/21

The project has identified the following use cases for mobile charging points:
•Emergency road closure and diversions – providing temporary support to shift large traffic queues or provide extra support in diverted traffic e.g. traffic being rerouted through small villages.
•Storms / winter resilience – when a power cut has limited battery charging
•Summer Tourist Peaks – large increase in demand as visitors look to charge
•Community / Sporting events – one off events looking for charging
•Local Emergency– Emergency services are decarbonising their fleets. Stakeholder engagement with them has indicated range anxiety concerns particularly in rural areas and in circumstance where the battery may deplete quicker when using equipment on site.

2) Develop a standard and specification for portable temporary EV chargers with key external stakeholders to assist with network resilience and meet short term demand.
And
3) Procure and demonstrate an agreed specification for portable EV charger.

A request for information on mobile charging systems which were available at the time was published in June 2020. The request for information obtained some interest, although responses were heavily delayed due to Covid 19. The responses included potential suppliers, whose products ranged from second life EV battery reusage to hydrogen fuel cells. With the size of the temporary EV charging solutions ranging from 20kWh individual chargers mounted on a trailer suitable for towing by a car and up to larger fuel cell device requiring 3 x 20ft containers. An internal decision was taken in April 2021 to not pursue the procurement of the portable EV charger. SSEN would not be able to own and operate the EV charge point under the EU Clean Energy Package regulations and there was limited interest for trials due to the low levels of EVs.

4) Identify the challenges of providing short term access to the network for temporary EV charging, including any regulatory changes that would be required to facilitate it.

The project investigated temporary connections defined as ad hoc (anywhere) or pre-prepared – sites along key trunk roads / locations which would have a prepared socket that could be connected to and electricity drawn as required.

The practicalities of the ad hoc connection were limited due to:
- Establishing available network capacity
- Proximity of overhead (or underground cables)
- Preparation of a quotation – there are many factors such as Electricity Connection Charges Regulations to be considered
- Acceptance of a quotation
- Payment of quotation
- Mobilisation of installation teams (perhaps requiring installation of overhead line poles and transformers)
- Preparation of cut-out location (this is where the existing electrical network is prepared / extended for a future temporary EV charger connection)

The pre-prepared connection on a road system for instance can be more easily accommodated. However, this comes with several challenges such as the metering aspects. Conventional supply points would have an individual MPAN (commercial meter which records energy consumption) and associated methodologies for charge for electrical energy. When considering a temporary EV charging point the connection is likely to have infrequent usage, therefore alternative arrangement needs to be investigated to ensure a fair and just pricing structure of electrical energy.

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5) Develop a commercial ownership model including a cost benefits analysis to understand the viability of wider roll out and adoption. Not proceed see section 5 for information.

5. Required modifications to the planned approach during the course of the project

The Network Licensee should state any changes to its planned methodology and describe why the planned approach proved to be inappropriate. Please confirm if no changes are required.

In our Innovation Strategy we commit to taking an agile approach with our innovation portfolio and with more robust tracking of project benefits to further improve the way we deliver our innovation projects into Business As Usual. In practice this means being quick to recognise when an innovation has proven itself and can be deployed into the business to deliver the anticipated benefits. Similarly, it is also about recognising when an innovation is less likely to deliver the anticipated benefits and re-focusing resource appropriately. The LEVEL project did not complete all objectives due to limitation with suppliers and Covid 19. The project was significantly underspent. The project has investigated the associated use cases for a mobile charging unit and the outline requirements of a portable charging solution. The project was prematurely closed due the limited benefits which are immediately available as EV uptake is still low and it may be something which is needed to be investigated further in the future. The learnings around temporary charging are still being investigated through the Resilience as a Service (RaaS) project and E tourism as well as WPD's NIA_WPD_056 Temporary Event Charging project.

6. Lessons learnt for future projects

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 learning captured during this project are outlined below:

Metering

Any temporary EV Charging unit which is non-operational could be 'trickle charged' (the batteries topped up) via a permanent metered connection at the operator's site, for example a local authority depot. All energy used at that site could be appropriately metered and paid for via the operator's normal billing arrangements with its supplier of choice.

However, when the unit arrives at a pre-prepared site, it requires a connection to a supply point, referred to earlier, otherwise its storage capacity will be quickly depleted. Conventionally each of these supply points would have an individual MPAN meter with an associated standing charge. With a number of these connection points likely to have infrequent usage, an alternative arrangement was investigated to reduce the associated standing costs.

The unmetered supply regulations allow a supply greater than 500W to be unmetered where the load is predictable in nature and it is impractical to provide a metered supply for the following reasons:

•Any metering costs are expected to be significantly higher than the usual charges for a similar metered connection.
•Where there are technical and practical difficulties in providing a metered connection. For example, the location of the supply point would require the metering to be installed next to a busy road or the size of the metering equipment prevents it from being installed in an appropriate weathertight metering box.
•Any legal and safety considerations involved in the installation and reading of a meter.

Note that the UK Government Department for Business, Energy & Industrial Strategy (BEIS) advises supplies to electric vehicle charging points should generally be metered because of the size of the load and the inability to predict the usage of such points. As a result, a key learning point is that temporary EV chargers connected to the network must be metered.

Measured Centralised Management System (MCMS)

The concept of unmetered connections is well known, and it is used extensively for stair lighting and access systems in common stairwells together with street lighting columns. However, in these applications the energy use is small and fixed enabling the supplier to establish a fixed monthly bill.

In this novel application, where the energy consumption by a temporary EV charger on-site will be considerably larger, a refinement to the above system is required. With the advent of newer technologies, particularly street level EV charging, a newer metering technology has begun to evolve. The asset, in this case the mobile charging unit, is assigned a Central Management System ID, which records the power consumed via actual on/off switching times and is stored on board. These power event logs are transmitted to the Meter Administrator, who can then use the inventory to calculate the Half Hourly data. This in turn is then sent to the owner/operator's energy supplier for billing purposes. The owner of the temporary EV charger may be a local authority or a private operator.

There is one potential drawback to this methodology which requires further investigation. It appears the MCMS calculates charges based on the notional power of the unit and the connection time. While this is acceptable if the connected device draws a consistent load throughout the connection time, it is more likely that the energy consumed will vary as the batteries regain full charge and therefore it is possible the calculated energy consumption will be higher than the actual figure. One way to address this problem is for the temporary EV charging unit to have an on-board meter to allow a comparison to be made. But whether or not, this can be factored into a MCMS generated bill remains to be understood.

7. The outcomes of the project

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.

The project has investigated the associated use cases for a mobile charging unit and the outline requirements of a portable charging solution. The project was prematurely closed due the limited benefits which are immediately available as EV uptake is still low and it may be something which is needed to be investigated further in the future. The learnings around temporary charging are still being investigated through the Resilience as a Service (RaaS) project and E tourism as well as WPD's NIA_WPD_056 Temporary Event Charging project.

8. Data Access & Quality Details

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.

For information on how to request data gathered as part of this project see Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure at https://www.ssen.co.uk/InnovationLibrary/Distribution/

9. Foreground IPR

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

There is no foreground IRP being developed as part of this project.

10. Implementation, recommendations or next steps

Please describe the next steps to implement this innovation project. What policies and standards need to be updated or created as part of this implementation.
n/a

The project was prematurely closed due the limited benefits which are immediately available as EV uptake is still low and it may be something which is needed to be investigated further in the future. The project has significantly underspent.

11. Other comments

n/a