Energy Networks Innovation Process

Annual Project Progress Report Document

The voice of the networks

Date of Submission: 26/07/2023

Annual Project Progress Report Document

Notes on Completion: Please refer to the NIA Governance Document to assist in the completion of this form. Please use the default font (Calibri font size 10) in your submission. Please ensure all content is contained within the boundaries of the text areas.

Project Title (*This cannot be changed once registered*)
Net Zero Service Termination

Project Reference
NIA_SSEN_0055

Funding Licensee(s)
1. Electricity North West Ltd
2. Northern Powergrid (Northeast) Limited
3. Northern Powergrid (Yorkshire) plc
4. Scottish Hydro Electric Power Distribution plc
5. SP Distribution Ltd
6. SP Manweb plc
7. London Power Networks plc
8. South Eastern Power Networks plc
9. Eastern Power Networks plc
10. Western Power Distribution (East Midlands) plc
11. Western Power Distribution (West Midlands) plc
12. Western Power Distribution (South West) plc
13. Western Power Distribution (South Wales) plc

Project Start Date
August 21

Project Duration
24 months

Year
2023

Nominated Project Contact(s)

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1. Scope

The ENA LCT Working Group has identified a range of cut-out and service cable types, as well as a range of installation scenarios which will be tested and analysed by the project. The outputs from the project will provide important learning for other projects which are looking at how DNOs can accommodate a very high number of connection applications anticipated to transition to Net Zero.

One such project which will benefit from this learning is the SPEN identify NIA project which is looking at the potential to digitise the process for applying to a DNO when a customer wants to connect LCT devices to their property. The identify project, has a primary purpose of employing Artificial Intelligence to identify the make and model of cut-outs, including their ratings and other information relevant to DNOs and also LCT devices, i.e. domestic EV charge points and HPs to be installed. The learnings from this project could improve project identify' s outputs.

2. Objective(s)

The learning from this project will help inform the DNOs and LCT installers of the suitability of cut-outs and service cable types for the connection of LCTs, thus avoiding such equipment from being overloaded and damaged. A comprehensive analysis of the de-rating of LCT connections on service termination equipment and service cables will create an understanding of these issues and allow a standard planning approach to be adopted on a nationwide basis. The resulting ratings could also be applied to DNO Business as Usual activities, such as allowing certain service positions to be operated under LCT loads or justifying the expense of upgrading cables and cut-outs to allow connection of LCT loads. The output from the project will be disseminated in the form of a database that will be publicly available. A custodian for this database will be identified as part of the project.

3. Success Criteria

The outputs of this project can be used as learning by DNOs, customers and LCT installers to establish the suitability of cut-outs and service cable types for the connection of LCTs, thus avoiding this equipment from being overloaded and damaged.

Publication of a database with recommendations on any changes to network design criteria will be published alongside a closedown report.

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

- The working group has identified service cables, terminations, looped services, and cut-outs as being potentially impacted by changes in loading. The method used by the project is summarised below, and will involve a combination of desk top research and physical testing using a test network which can simulate the various testing environments:
- Understand the ability of service termination cut-outs, looped services, and service cables in customer premises to withstand additional loading applied by LCTs;
- Understand and test the de-rating effects on customers service cables under practical operating conditions, when subject to additional LCT loading;
- Understand the ability of street furniture service cut-outs and cables to withstand additional loading applied by EVs;
- Understand and test the de-rating effects on street furniture service cables under practical operating conditions, when EVs are connected to them;
- Test cut-outs and service cables, with the new LCT duration curves and identifying the level of de-rating against the original cut-out/cable standards;
- Once any de-rating has been identified, the project will make recommendations on how these may be incorporated with future network design methodologies;
- The outputs of this project can be used as learning by network companies and LCT installers to establish the suitability of cut-outs; and
- Service cable types for the connection of LCTs, thus avoiding this equipment from being overloaded and damaged.

Key progress been so far:

- Service cable installation test mock-ups have been agreed and built.
- Service cable and termination samples have been received, the last service cable of 35mm SNE was delivered 19/4/23.
- Specialist equipment installed on rig to measure low AC mV volt-drops on cut-outs during testing.
- Safety controls to isolate test equipment, in the event of an emergency/over-heating, have been designed and incorporated into the rig controller, these have been working well during testing.
- Commissioning of the domestic service cut out rig has completed and cable now being tested.
- Construction of the service cable installation test rig has now been completed, along with street lighting set up.
- Document and Photograph Cut-out and Service Cable Samples

Progress made against key tasks is as follows:

Service terminations and service cable testing methodologies have been designed and agreed through a project team workshop. The design and approval of the service cable installations and test stations scenarios that have been recommended is complete.

Project planning workshops identified the three-service cable installation test scenarios recommended within the service cable Installation Literature Survey and these have been discussed and implemented.

Construction of mock cut-out enclosures has been completed. This includes the construction and testing of the five-signal conditioning and precision rectifier units and their incorporation in the test rig. This has enabled a very low AC voltage drop to be measured across the cut-outs and logged whilst the rig is running. This allows the power dissipation to be calculated over time, giving a very valuable insight as to the heating effects of the individual cut-outs compared to the other components housed in the meter enclosure. These cut-out enclosures have been subject to solar radiance in the form of lamps to understand if solar radiance has an effect on the cut-out as the temperature will increase within the enclosure. The enclosures for looped services have been agreed and constructed and testing is under way.

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.

The licensees agreed to remove LSOH cable from the test schedule as

- Sourcing LSOH is difficult and expensive.
- Little value would be gained by testing LSOH compared to other cable types due to the rare use of LSOH in a domestic situation.

Testing of PILC was also removed from the test schedule as

- Lead times in manufacturing of new PILC cable would be +6 months and expensive (£350 per metre with a minimum buy of a 500m roll)
- PILC cable (35 mm) will never be installed in a domestic meter box hockey stick; it will be clipped to a wall. PILC is not used externally on domestic installations therefore no solar loading testing would be required.
- Any domestic LCT installations would result in a service cable and cut out upgrade. It is therefore highly unlikely that high LCT loads (e.g. from EVs or heat pumps) will be passed through a PILC cable.

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.

Awaiting final report to discuss any recommendations to change in policy or further testing/projects.

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.

Awaiting Final close down report from EATL**.**

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 how to request data gathered in the course of this project, see Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure at https://ssen-innovation.co.uk/innovation-strategy/.

9. Foreground IPR

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

N/A.