Energy Networks Innovation Process

Annual Project Progress Report Document

Date of Submission: 28th July 2022

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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*)
Smart Hammer

Project Reference
NIA_SSEN_0044

Funding Licensee(s)
Scottish Hydro Electric Power Distribution and Southern Electric Power Distribution

Project Start Date
February 2020

Project Duration
30 months

Year
2022

Nominated Project Contact(s)
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1. Scope

STAGE 1 - SMART HAMMER DEVELOPMENT - X-Models
X Model Development
Define Hammer Evaluation Test strategy
Evaluate Accelerometer sensors
Make Sensor Selection

STAGE 2 - SMART HAMMER DEVELOPMENT - A-Models
A Model Development
Create automated testing environment
Determine Utilization Parameters
Develop Data extraction
Field Trial Smart Hammer to Identify the Sensor Selection.
Create Draft Training Material

STAGE 3 - SMART HAMMER DEVELOPMENT- B-Models
B Model Development. Refine & Build Prototype Hammer with finalised Sensor Selection
SSE Evaluate IT System for Maximo Integration
Refined Automated Swing Test for operational improvement
Prototype Field Trials & Evaluation

STAGE 4 - SMART HAMMER DEVELOPMENT - Pre- Pod-Models
Build Pre-Production of finalized Hammer
I.T – Maximo integration
Data Analytics Trial
Pre-Prod Models Field Test & Evaluation
Policy & Procedure to approve network testing.
Create Training Material

STAGE 5 - Field Trials
Undertake Field Trials
Capture Trial Data
Field Trial Evaluation
Compare Baseline & Field Trials
Recommendations for BAU

STAGE 6 - Closure
Finalize Policies & Procedures
Finalize Training Material

2. Objective(s)

By the end of the project

1. To have established the technical and commercial viability of using a Smart Hammer with accurate and repeatable results.
2. Conduct consistent and reliable initial wood pole inspections as an alternative to the traditional hammer test method.
3. The ability to capture pole data and integrate with asset databases
4. To have disseminated the learning from the project through annual or exceptional events for the benefit of GB customers.

3. Success Criteria

1. Early identification of equipment not to take through development phases and field trials.
2. Ability to test poles within asset health scoring matrix.
3. Ability to detect poles requiring replacement without the need for secondary invasive techniques.
4. Ability to notify systems that secondary testing is required with more advanced technical equipment.
5. Low cost Smart Hammer which is affordable to issue to all overhead line assessors and linesmen.
6. Efficient consistent pole test scores no matter who uses the hammer.
7. Ability to capture the information from the Smart Hammer in the asset database via a Smart Phone application.
8. Ability to capture granular detail of pole condition to enable desktop assessments for efficient planning.
9. Ability to demonstrate wood pole asset health with accuracy – Data assurance and improve accuracies in reporting.
10. Opportunity to improve and make internal processes more efficient adopting Smart Hammer as a front-line tool and a create a response matrix.

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

This project has been established to develop an instrument that can accurately detect the asset health condition of a wood pole with the ability to record the asset health score and other relevant data.

Project Progress

Between April 2021 and the end of March 2022 the following has been achieved;

1. To have established the technical and commercial viability of using a Smart Hammer with accurate and repeatable results.

The project has established the concept of the Smart Hammer and the technical and commercial viability of using a Smart Hammer with accurate and repeatable results, through factory development and initial field trials. Factory Acceptance Testing of the post-production Smart Hammers was carried out at the Spectral Line Ltd facility in Harris this was followed by a two-day field trial with participation from SSEN BaU teams. The successful field trial demonstrated how the data from the Smart Hammer could be integrated with the SSEN MAXIMO asset management database.

Having been able to prove the initial prototype of the Smart Hammer successfully, this project has progressed and is now being extensively trialled on wood pole overhead line networks.

2. Conduct consistent and reliable initial wood pole inspections as an alternative to the traditional hammer test method.

Through stakeholder engagement we have been able to test prototype versions of the hammer in the field environment. Operational personnel that are involved in wood pole testing have been using the prototype versions of the hammer, in addition to their normal procedures. The capture of data from the field trials has been fundamental in the hammer prototype development process and will continue to be further evaluated.

3. The ability to capture pole data and integrate with asset databases.

The project has identified the requirements around the integration of field data collected from the smart hammer into our asset databases. This was successfully trialled, and the project was able to demonstrate how the Smart Hammer data can be imported to the SSEN MAXIMO asset management database.

4. To have disseminated the learning from the project through annual or exceptional events for the benefit of GB customers.

The Smart Hammer project was presented at the 2021 ENIC virtual conference. The presentation was made in conjunction with the NpG and UKPN THOR Hammer project. Both projects generated a lot of engagement and discussion from the audience.

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.

A third party (EnergyLine) have been introduced into the project to carry out validation of Smart Hammer performance, by providing independent engineering assessment including empirical validation of pole condition assessments.

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.

To keep the project on track we have had to innovate during the Covid 19 pandemic with regards to how we conducted witnessing the factory trials of the hammer. A full account of all lessons learned from the project will be made available in the close down report.

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.

So far, the product is working as expected and there is strong stakeholder support internally to deliver the rest of the project and understand business as usual options for implementation.

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 information gathered by 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