**Date of Submission**

**May 2021**

# Network Innovation Allowance Progress Report

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form.

Network Licensees must publish the required Project Progress information on the Smarter Networks Portal by 31st July 2014 and each year thereafter. The Network Licensee(s) must publish Project Progress information for each NIA Project that has developed new learning in the preceding relevant year.

## Project Progress

**Project Title**

Informed Lightning Protection

**Project Reference**

NIA_SSEN_0035

**Funding Licensee(s)**

Scottish Hydro Electric Power Distribution, Southern Electric Power Distribution

**Project Start Date**

March 2019

**Project Duration**

4 years and 0 months

**Nominated Project Contact(s)**

Colin Mathieson

**Scope**

· Only 11kV and 33kV circuits will be protected.
· Protection will target lightning related faults only.
· Development of the lightning model is for analytical purposes only.

Results will be reviewed over a four-year period, but this time scale can be shortened if objectives are met earlier.

**Objectives(s)**

1) Develop a 'point in time' lightning analysis tool that can be used to locate lightning protection equipment in the most optimal way i.e. integrate various data sets and update visual display as described in phase 1a and 1b above.

2) Install lightning protection equipment in 'optimal' locations provided by the lightning analysis tool.

3) Monitor and analyse fault data to confirm effectiveness of lightning protection.

4) Update internal policies and procedures if the project is successful.

5) Share learnings with wider audience.

**Success Criteria**

The project will be a success if:

1) A point in time analytical tool is sufficiently developed so that it can integrate the different data sources described in phase 1b and perform advanced analytics, so that it can be used for the purpose of deciding where to place lightning protection equipment down to the nearest pole.

2) We install lightning protection equipment safely, on time and within budget.

3) We prove the effectiveness of this methodology for protecting against lightning related faults from a cost and fault reduction point of view.

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

Objective 1 and Success Criteria 1 have been met via the creation of an analytical tool that was able to analyse multiple data sets to identify the circuits most likely to be at risk of a fault caused by a lightning strike. We then utilised further information from an existing internal lightning tracker tool to identify the location of lightning hot spots. Information from the combination of these two tools has then been used to identify the locations to install lightning protection.

The installation of these surge arresters, which will protect the overhead circuit form a lightning strike, is planned for later this year.

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

No modifications to date.

**Lessons Learnt for Future Projects**

An interesting early finding has been that the circuits deemed highest risk of experiencing lightning faults by the data analytics phase were significantly different from those circuits that historically have been recorded as experiencing lightning faults in our fault database. This could possibly mean:
Labelling faults as being caused by lightning is incorrect. It may be that extreme weather and water ingress is the problem rather than lightning, therefore it might be more prudent to alter maintenance/replacement cycles associated with overhead circuit assets rather than protect circuits against lightning.
The analytics algorithm could be incorrect and therefore not correctly identifying the highest risk circuits.
With the course of the project entering the field installation and trialling phase, more certainty will be gained as to whether point 1 or 2 is correct. The field install will see lighting protection trialled on both circuits deemed high risk by the data analytics and circuits deemed high risk by historic fault data.

**The Outcomes of the Project**

Project is still in early phases with no significant updates.

**Data Access**

The main data sources that were used and links on how to obtain them can be found below:

Lightning data: https://www.meteorage.com/
Soil resistance data: https://www.bgs.ac.uk/home.html?src=topNav
SSEN GIS data: mapping.services@sse.com

SSEN fault data: This is not publicly available. It is possible that a fault data extract can be provided, but this is subject to approval.

Contact futurenetworks@sse.com for more information.

See Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure at https://www.ssen.co.uk/InnovationLibrary/Distribution/

**Foreground IPR**

The main IPR developed here is how the decision is made on whether a lightning strike caused a fault. The table below shows this. However, it should be noted that this methodology is still not proven. More clarity will be gained on this by the end of the project.

Note: Please see PDF attachment for table.