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

Automated Loop Restoration

Project Reference

NIA_SSEPD_0009

Funding Licensee(s)

Scottish Hydro Electric Power Distribution

Project Start Date

June 2015

Project Duration

3 years and 9 months

Nominated Project Contact(s)

Joe McNeil

Scope

Two sections of 11kV overhead line networks have been chosen which share a common switching point and this is normally kept open to separate the line sections. These two sections will be combined into an overall scheme with 8 sections by installing 7 pole mounted circuit breakers (CBs).

These 11kV circuits on the Kintyre Peninsula are supplied from sub stations at Campbeltown and Ballure.
Data on supply interruptions is available and has been analyzed for the 8 year period 2007 to 2015 to establish a base line. The 7 pole mounted CBs will be installed with one placed at the common normally open point and 3 CBs on each line. The CBs will be fitted with a low cost communications option using mobile telephone technology. The operation of the scheme will not be dependent upon this communications technology but it will be used to provide information on the status of the scheme and occasional monitoring of network power flows. It is expected that installation on site will be completed for the start of winter 2015/16. We will then monitor the faults on the line for a three year period to the end of 2018. In early 2019 we will analyze the effectiveness of the scheme.

If the scheme effectively improves the network performance by reducing CIs and CHLs then it will be left in place as a business as usual deployment.

Objectives(s)

- Achieve an effective reduction in CIs and CHLs over the three-year trial period by 50% when compared to the base line figures for the 8 years from 2007 to 2015.
  • No network fault to affect 100% of customers on the feeder during the trial period
- Demonstrate that it is feasible to restore supplies to 50% of customers on the overhead line from Ballure substation towards Campbeltown, following a fault on the single 33kV circuit to Ballure substation.

Success Criteria

Determine the impact on network performance delivered by the automated loop restoration methodology on the trial network sections.

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

1. Achieve an effective reduction in CIs and CHLs over the three-year trial period by 50% when compared to the base line figures for the 8 years from 2007 to 2015. The entire system of seven pole mounted CBs has not been fully deployed. Initially, there were delays in installation partly due to difficulties in integration of communications with the new technology as well as the lengthy timescales of consolidation activities around particular working policies which were necessary for the trial project.After installation of three units, some significant learning associated with the main technology under trial arose from another project on the Isle of Wight. To investigate the learning from the Isle of Wight and understand its impact on this project, further delays ensued. In the meantime,SSEN commenced deploying a SCADA based system of automated restoration which works with conventional hardware and the existing Distribution Management System (DMS). That approach delivers the same benefits as the project under trial and therefore superseded this project's method.Decommissioning of the circuit breakers already installed is in progress before the project is expected to be brought to an early close.This objective was therefore not fully met.
2. No network fault to affect 100% of customers on the feeder during the trial period. As stated in the foregoing section, the full system has not been installed. The objective has not been met.
3. Demonstrate that it is feasible to restore supplies to 50% of customers on the overhead line from Ballure substation towards Campbeltown, following a fault on the single 33kV circuit to Ballure substation. Same as above, the objective has not been met

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

As the trial project progressed, SSEN adopted a new proven system of automated restoration which made use of existing systems. It was therefore decided to remove the three pole mounted CBs which have been installed, subject to availability of outages, from the overhead line and return the network to normal.When decommissioning is complete, it is expected that the project will be brought to an early close.

Lessons Learnt for Future Projects

Projects should allow a much longer lead time to integrate communications of new pieces of equipment with the internal control systems. It may be possible to gain agreement and complete the integration of the communication system prior to actual plant delivery.The sequence of operational communication system prior to plant integration placed a significant burden on resources in 2015/16 on developing communication between the Distributed Management System (DMS) and the field devices. While important to get the scheme to a stage where it could be installed, communications development was not a major part of the project under trial. As a result, equipment was kept in storage for several months before initial deployment.While the communications were eventually made to work,they used a system which was lightly loaded at the time of testing and first installations. Subsequently, however,many more pole mounted Circuit Breakers were connected to that system and the high data rates from this project's trial devices started to cause congestion issues which became a major challenge to resolve. This resulted in communications to the one unit fully commissioned being cut off for periods to ease the load on the communications network.
In project planning stages, it is vital to understand the potential impact of internal business as usual policies on innovation projects. Significant time and resources were

expended in gaining agreement to allow some of the techniques to be developed and operational on the network. Since the development of work instructions to allow the foregoing techniques was running in parallel within the relevant department, this trial project's schedule could have been better aligned with the timeline of the associated business as usual activity.

The Outcomes of the Project

N/A

Data Access

N/A

Foreground IPR

N/A