

NIA ENWL027 Enhanced LFDD

Progress Report

31 July 2023



VERSION HISTORY

Version	Date	Author	Status	Comments
V1.0	25/07/2023	Chris Greenfield	Final	

REVIEW

Name	Role	Date
Geraldine Paterson	Innovation Manager	26/07/23
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APPROVAL

Name	Role	Date
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GLOSSARY

Term	Description
BSP	Bulk Supply Point – Generally a 132/33kV transformer substation
FAT	Factory Acceptance Test
LFDD	Low Frequency Demand Disconnection
PSP	Primary Supply Point – Primary Substation (33/11kV)

1 PROJECT FUNDAMENTALS

Title	Interface
Project reference	NIA_ENWL027
Funding licensee(s)	Electricity North West Limited
Project start date	June 2021
Project duration	Original duration 1 year 7 months. Now extended to 2 years 7 months, completion due Feb 2024
Nominated project contact(s)	innovation@enwl.co.uk

2 PROJECT SCOPE

The project will carry out the following:

- Design and test firmware updates for the SuperTAPP SG relays to allow provision of the Low Frequency Demand Disconnection (LFDD) function
- Design a number of variations of LFDD schemes around the relay that takes levels of generation into account
- Carry out a set of test installations at a number of Electricity North West Primary Supply Points (PSPs)
- Test the functionality of the relays in situ, using methods which do not put customers at risk, i.e., using accepted protection testing methods such as secondary injection with the trip links removed
- Carry out a desktop study to show the costs and benefits of rolling out this approach network wide
- Investigate the possibility of using a centralised LFDD response scheduler application to adjust the number of sites required for each LFDD block, including consideration of how these adjustments might be made

3 OBJECTIVES

- Demonstrate the ability of the relay to provide a LFDD response that complies with required standards for operation
- Identify a scheme design that provides the appropriate response whilst accounting for power flows
- Test this scheme on real world installations at around six PSPs fed from a common BSP and which have high levels of connected generation
- Identify future possible improvements to the scheme and a next phase of this project

4 SUCCESS CRITERIA

- Design of potential options for delivering intelligent LFDD at a PSP level
- Successful Factory Acceptance Test (FAT) of the updated relays to demonstrate the technical compliance with the LFDD requirements
- Update of a group of PSPs to the new firmware, along with monitoring on high generation circuits
- Site testing of the new firmware to prove operability in real world scenario's

- Report detailing the outcomes of the testing, identifying potential future improvements, setting out any possible changes to the Grid Code pinpointed by the trials

5 PERFORMANCE COMPARED TO THE ORIGINAL PROJECT AIMS, OBJECTIVES AND SUCCESS CRITERIA

The project has produced an Outline Design Document which fulfils the following project aims, objectives and project success criteria:

- Design a number of variations of LFDD schemes around the relay that takes levels of generation into account
- Identify a scheme design that provides the appropriate response whilst accounting for power flows
- Design of potential options for delivering intelligent LFDD at a PSP level

This document defines four use cases to be trialled during the project, which are as follows:

- A PSP with no connected generation
- A PSP with connected generation, where both transformers are to trip dependant on export level
- A PSP with connected generation, where the intent is to trip on bus section only
- A PSP bus section with connected generation, where the intent is to trip one bus section dependant on the export level

The document also details the initial design proposals including the proposed architecture and performance requirements.

The project is currently working on the following project aims and objectives in order to satisfy its success criteria over the next three months:

- Fundamentals Ltd to complete firmware update on the SuperTAPP SG relays to perform LFDD functionality
- Successful FAT of the updated relays to demonstrate the technical compliance and standards with the LFDD requirements
- Simulate the operation of the relays LFDD function for each use case on the NMS testing system
- Develop a plan for the operation and testing of the relays LFDD function on the live network without compromising customer security of supply

6 REQUIRED MODIFICATIONS TO THE PLANNED APPROACH DURING THE COURSE OF THE PROJECT

The project has just completed the scoping and design stage. The timeframe has been extended by a year in order to allow for completion of the SuperTAPP SG framework update and testing. The completion date for the project is now due in Feb 2024

7 LESSONS LEARNED FOR FUTURE PROJECTS

There have been no lessons learned to date that would be applicable to other projects

8 THE OUTCOME OF THE PROJECT

Not applicable.

9 DATA ACCESS

Electricity North West's [innovation data sharing policy](#) can be found on our website.

There has been no data gathered so far during the project.

10 FOREGROUND IPR

None

11 PLANNED IMPLEMENTATION

Not applicable.

12 OTHER COMMENTS

Not applicable.