NIA ENWL031

Advanced Transformer Monitoring System

Progress Report

31 July 2023

VERSION HISTORY

Version	Date	Author	Status	Comments
V1.0	28/07/23	Ben Ingham		

REVIEW

Name	Role	Date
Andy Howard	Innovation Programme Manager	29/07/23
Geraldine Paterson	Innovation Manager	29/07/23

APPROVAL

Name	Role	Date
Victoria Turnham	Head of Network Innovation	30/07/23

CONTENTS

GLOSSARY

Term	Description
DG	Distributed Generation
ENWL	Electricity North West Ltd
LCT	Low Carbon Technologies

1   PROJECT FUNDAMENTALS

Title	Sentinel
Project reference	NIA_ENWL031
Funding licensee(s)	Electricity North West Limited
Project start date	March 2022
Project duration	1 year and 6 months
Nominated project contact(s)	innovation@enwl.co.uk

2   PROJECT SCOPE

This project will explore enhancement of existing transformer monitoring equipment to enable to provide better targeted data collection. It will also establish the integration of the existing monitored transformer fleet into data solutions, create a data model for the new transformer risk assessment, and look to apply advanced analytics capabilities in different ways. The final capability delivered will be a number of holistic predictive models that effectively digitally twin the monitored transformer fleet. These will deliver various capabilities around anomaly detection in transformers affected by local network configurations, connection of distributed generation (DG) and low carbon technologies (LCT) and other load-based effects, if relevant.

This project will run for sixteen months and comprise upgrading existing units to include the enhanced functionality, creation of a secure web portal to provide visibility of asset condition, and analysis of the additional data to refine the models.

3   OBJECTIVES

The project will look to enhance and automate transformer condition monitoring and use this to drive the asset management strategy. It will also revise and update the models used to determine the impact of various factors on transformer condition to account for changes in load types.

4   SUCCESS CRITERIA

- **Hardware Installation:** Upgrades to the TOTUS fleet (40 systems) to collect and count additional events such as through faults.

- **Data Management:** creation of a framework to host Electricity North West Ltd (ENWL) data on the Kelvatek data platform, to import historical data and to update the data during the project duration.

- **Transformer Reports with Advanced Analytics**: create a secure web-based portal to enable ENWL to check the condition of the transformer fleet and indication of the mitigation actions.

- **Investigation on Transformer advanced Machine Learning Techniques:** This objective utilises machine learning techniques to develop and refine the models used to understand the impact of various factors on transformer condition.

- **Conduct Asset Management Integration:** Implementation of the data configuration from the monitoring systems into the ENWL asset management database.

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

The project is on track to deliver against its objectives; however, it has been necessary to extend the timeframe. Challenges with the supply chain and labour availability have meant that the upgrade of the Totus units has been slower than anticipated.

By advancing other aspects of the project, our partners, have delivered a prototype dashboard which provides a simplified condition overview, with the ability to drill down into the more detailed data as required. This has been demonstrated to our Asset Management team and is now being refined following their feedback.

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

Due to challenges with the supply chain and labour availability, the upgrade of the Totus units has been slower than anticipated. These installations are expected to be complete by November 2023. This delay has necessitated an extension to the overall project timescales.

In order to reduce the effect of the upgrade and make the required extension as short as possible we decided to investigate a refocus the data analytics work to use currently available, as well as historic data. Working with the data analytics team and utilising all currently available data along for the specific transformers we were able to progress this work and avoid significant delays to this aspect of the project.

7 LESSONS LEARNED FOR FUTURE PROJECTS

Given the recent volatility in global supply chains it is important to work with the procurement team and the suppliers at project set up to understand and minimise any risks associated with delivery.

Earlier engagement with the operations staff in order to resource the installation requirements around their business as usual commitments is key, especially in the approach to the end of a price control.

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.

The data collected in this project is specific to ENW assets and thus of limited use to third parties, it can be made available on request.

10 FOREGROUND IPR

There is no foreground IPR that has been developed by the project.

11 PLANNED IMPLEMENTATION

Not applicable.

12 OTHER COMMENTS

Not applicable.