Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Mar 2025

Project Reference Number

NIA_SPEN_0108

Project Registration

Project Title

Enhanced Asset Visibility & Assessment for Overhead Line Poles (EAVA-OHL)

Project Reference Number

NIA_SPEN_0108

Project Licensee(s)

SP Energy Networks Distribution

Project Start

May 2025

Project Duration

1 year and 8 months

Nominated Project Contact(s)

Andrew Woods

Project Budget

£225,000.00

Summary

To ensure compliance with the Ofgem DNO CNAIM v2.1 methodology, an enhanced approach that goes beyond the current practice of hammer and prod testing for wood pole assets is required.

This project will investigate the optimal approach for wood pole condition assessment through a review of existing technologies, including those previously trialled by the networks and compare with current SPEN procedure.

The project will trial two novel solutions to further expand the range of technologies available to DNOs for assessing and addressing condition issues:

- Polux in-field residual strength testing device – to be trialled in the field and selection of poles destructively tested to validate device results.
- Gridguard pole-mounted sensors – to be trialled in areas with known condition issues caused by woodpecker damage.

Recommendations for a holistic pole health assessment approach will be made to support future OHL inspection and condition assessment policy development.

Third Party Collaborators

Gridguard AS

Poletec Ltd

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

Electricity operators require a solution to obtain a measured value for wooden pole asset condition to input into the DNO Common Network Asset Indices Methodology (CNAIM 2.1) measurement points. The current SPEN practice for wooden pole assets is an inspection and condition assessment using a hammer test conducted by field staff. Where decay is suspected, further investigation is carried out using a prodding test. However, this method is subjective, requires suitably experienced field operatives and does not produce a quantitative value.

There exists a broad range of technologies for pole condition assessment. However, there is not yet an agreed upon approach to determine the optimal combination of technologies for obtaining measured values of pole asset condition and aligning these measured values with asset management systems and CNAIM. Therefore, there exists an opportunity to trial new technologies and compared these new solutions with existing solutions. Based on the merits of each approach, we propose to develop a holistic pole condition assessment approach that provides a range of tools for asset inspection.

Method(s)

This project seeks to develop an approach to pole condition assessment that combines on-site inspection with targeted remote monitoring (for known problem areas) to demonstrate how a measured value for pole condition could enable a more efficient, targeted approach to pole inspection and replacement whilst continuing to reduce asset risk and increasing the efficiency of modernisation programmes.

The project will critically review existing solutions for wood pole health assessment to produce a matrix of different technologies and define the optimal combination of technologies/techniques to achieve the balance of cost and reliability. This project will also trial two new solutions as part of this approach to broaden the number of tools available to DNOs for pole condition assessment. Polux 5 residual strength testing devices will be trialled to test circa. 500 poles which will then be validated through destructive testing to demonstrate a more qualitative alternative to current hammer testing. Gridguard sensors will be trialled for detecting and deterring woodpecker damage and, more generally, providing an early warning of pole rot in challenging environments.

By comparing the previously tested solutions and those trialled in this project, this project will seek to make recommendations for a CNAIM 2.1-compliant pole condition assessment methodology that achieves the optimum balance of time, cost, and reliability.

Data Quality & Measurement Statement

Polux Field Assessment

Network circuit information such as geolocation will be shared with Poletec to facilitate planning inspection route and site selection
Site Inspections: Process of data capture and its subsequent transfer to the Picus software platform/server.
Immediate results from Polux upon completing the test allows the inspector to override if necessary
Data is uploaded from handheld device to Picus platform where it can be reviewed, utilised, etc.
Data Formats: Data can be in multiple formats such as PDF, Excel, mapping, etc.

Gridguard Remote Monitoring

Grid Scout is a full-stack platform that acquires data from in-field sensors and processes it through a backend with two front-end interfaces:
Smartphone GIS App: Used for sensor deployment, field notes (including photos), push notifications for event alerts, and GIS-based task management.
Grafana Dashboard: A desktop-based interface providing time-series data visualisation with multiple selection tools for analysis. Data is categorised by topics for clarity.

- Milestone 1: Data Access & Flow

Access Control: Access is granted at deployment based on project roles. Line workers use the app, while project administrators access the dashboard.
User Activation: User access requires a pre-submitted list of emails. Once activated, users receive login credentials and links to the dashboard and app stores.
Data Streaming: Data streams to the front-ends once sensors are deployed. The dashboard includes:
Averaged data over hours, days, or months.
High-resolution event-triggered samples (CSV and PNG formats) for detailed insights.
Screenshots of graphs and data exports enable easy sharing and reporting.

- Milestone 2: Data Analysis & Reporting

Data Collection: Once sufficient data is collected (either averaged or event-specific), it undergoes analysis.
Reporting: Findings are shared through project reports.

- Data Security & GDPR Compliance

User Data: Only email addresses for access control are collected; no personal data is stored.

IT Security: We adhere to best practice guidelines from the Norwegian industry body Kraftcert (https://www.kraftcert.no/en/) for IT security and operations.

- This approach ensures data completeness, accuracy, interoperability, security, and adherence to relevant regulations and best practices.

Scope

Electricity operators require a solution to obtain a measured value for wooden pole asset condition to input into the DNO Common Network Asset Indices Methodology (CNAIM 2.1) measurement points. The current SPEN practice for wooden pole assets is an inspection and condition assessment using a hammer test conducted by field staff. Where decay is suspected, further investigation is carried out using a prodding test. However, this method is subjective, requires suitably experienced field operatives and does not produce a quantitative value.

There exists a broad range of technologies for pole condition assessment. However, there is not yet an agreed upon approach to determine the optimal combination of technologies for obtaining measured values of pole asset condition and aligning these measured values with asset management systems and CNAIM. Therefore, there exists an opportunity to trial new technologies and compared these new solutions with existing solutions. Based on the merits of each approach, we propose to develop a holistic pole condition assessment approach that provides a range of tools for asset inspection.

This project seeks to develop an approach to pole condition assessment that combines on-site inspection with targeted remote monitoring (for known problem areas) to demonstrate how a measured value for pole condition could enable a more efficient, targeted approach to pole inspection and replacement whilst continuing to reduce asset risk and increasing the efficiency of modernisation programmes.

The project will critically review existing solutions for wood pole health assessment to produce a matrix of different technologies and define the optimal combination of technologies/techniques to achieve the balance of cost and reliability. This project will also trial two new solutions as part of this approach to broaden the number of tools available to DNOs for pole condition assessment. Raglan Projects will be contracted to trial Polux 5 residual strength testing devices in a limited trial to test circa. 500 poles which will then be validated through destructive testing to demonstrate a more qualitative alternative to current hammer testing. Gridguard sensors will be trialled for detecting and deterring woodpecker damage and, more generally, providing an early warning of pole rot in challenging environments.

By comparing the previously tested solutions and those trialled in this project, this project will seek to make recommendations for a CNAIM 2.1-compliant pole condition assessment methodology that achieves the optimum balance of time, cost, and reliability.

Objective(s)

- Review of available technologies, and current strategies in the UK, for overhead line condition assessment and their previous use, benefits and drawbacks of each technology
- Trial of the Polux in-field testing device on a selection of SPEN circuits to test suitability of non-destructive technology to provide measured condition value for pole strength
- Determine the validity of assessment results through appropriate validation methods – such as destructive testing of a subset of the inspected assets – to ensure measurements results in accurate probability of failure (PoF) calculation and improved modernisation forecasts
- Demonstrate the suitability and commercial viability of pole-mounted monitoring devices for woodpecker damage monitoring and deterrent, to avoid early replacement of assets due to damage and ensure cost-efficiency of new OHL installations.
- Investigate potential application of the pole-mounted devices for fault detection and location, to reduce restoration times following faults.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

An assessment of distributional impacts (technical, financial and wellbeing related) for this project has been carried out using a bespoke assessment tool, which assesses the project as having a positive, negative or neutral effect on consumers in vulnerable situations. To help inform the assessment, this tool considers the categories of consumers identified in the Priority Services Register.

This project has been assessed as having an overall positive impact on consumers in vulnerable situations. The assessment has identified that this project has the potential to reduce the occurrence and duration of supply interruptions and reduce costs (such as bills, appliance maintenance, etc.) for households.

Other considerations including the project's impact on supply, immediate health and safety in the home have been made in carrying out this assessment.

Success Criteria

- Range of available technologies identified and their respective merits, drawbacks, similarities and opportunities compared.
- Completed field testing of Polux 5 device across an appropriate number of pole assets
  - Comparison of results between non-destructive and destructive testing on a subset of testing poles with varying health, to allow identification of any relationship and produce an accuracy score
- Gridguard pole-mounted monitoring deployed at pilot scale
  - Provide comparative inspection results for at least 2 circuits following a sufficient length of time in operation to understand benefits case
  - Provide comparative network performance history for at least 2 circuits following a sufficient length of time to understand potential fault detection capabilities/opportunities from the technology.

Project Partners and External Funding

No external funding.

Suppliers for this project are Gridguard AS and Poletec Ltd.

Potential for New Learning

This project will develop new learnings on the availability and suitability of different technologies for

- Publication of annual progress report and end of project report
- Dissemination via relevant forums such as ENA working groups and external conferences, as appropriate.

Scale of Project

The project will trial the selected solutions on circuits within the SPD and SPM licence areas. Up to 500 wooden poles will be selected for assessment. It is intended that a trial on this scale shall be sufficient to produce meaningful results across a variety of different asset conditions at acceptable cost.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The project will trial the selected solutions on circuits within the SPD and SPM licence areas across a range of trial sites.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

£225,000

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

This project has the potential to facilitate the energy system transition by improving network reliability through the adoption of new technologies and practices for asset condition assessment that will modernise asset health and monitoring capability for wooden pole assets on the distribution network.

This project will trial remote condition monitoring devices, for sites with accelerated asset degradation due to woodpecker damage, to detect and deter further damage. This can potentially reduce resource requirements associated with repeat/increased field inspection and assessment that would otherwise be needed to monitor the health of these at-risk assets.

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

N/A

Please provide a calculation of the expected benefits the Solution

This project will improve compliance with Ofgem's regulatory regime which requires electricity network operators to obtain measured condition values for their wooden pole assets for input into the DNO Common Network Asset Indices Methodology (CNAIM 2.1) measurement points.

Avoided replacement of wooden pole assets before end of useful life through adoption of data-driven, measured condition assessment could save up to £2m per annum which would be reinvested in interventions on the right pole assets, at the right time. This value assumes that 10% poles are replaced before the end of their useful life. This value increases as percentage of poles increases.

Due to improved accuracy in NARM asset classification, resulting in a possible risk point reduction, SPEN could see a net benefit of £2.9m per annum. This assumes that up to 5% of poles are potentially classified as HI3 (medium risk) where, under enhanced inspection and assessment, their 'true condition' would be demonstrated to be HI5 (high risk).

Please provide an estimate of how replicable the Method is across GB

It is anticipated that this method will be applicable across all Network Licensees that own and maintain HV wooden pole assets. Network operators could expect to generate benefits similar to those outlined above, adjusted to account for the difference in scale/volume of their wooden pole asset base compared with SPEN.

Please provide an outline of the costs of rolling out the Method across GB.

As this project will review a suite of available technologies and demonstrate two new technologies in live trials, it is expected that our

understanding of the most appropriate solution for rollout and its associated costs will be developed through the project.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

☐ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).

☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)

☐ A specific novel operational practice directly related to the operation of the Network Licensees system

☐ A specific novel commercial arrangement

RIIO-2 Projects

☑ A specific piece of new equipment (including monitoring, control and communications systems and software)

☑ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven

☑ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)

☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology

☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution

☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

This project seeks to generate new learnings that improve understanding of best practices for condition assessment of wooden pole assets, which today has no agreed upon approach across DNOs, and demonstrate the suitability and effectiveness of novel technologies for obtaining a measured condition value that DNOs can utilise within their asset risk calculations, as per the Ofgem CNAIM requirements.

The deployment of remote monitoring devices across large, distributed asset bases such as the network of wooden poles on a DNO's overhead line network would ordinarily be expected to be cost-prohibitive. Therefore, this project will seek to generate new learnings on where, when and how these devices should be employed effectively to balance the need for enhanced condition assessment with cost. This will help other licensees to assess the suitability of such technologies for deployment on their own networks.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

n/a

Is the default IPR position being applied?

☑ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNF, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

This project seeks to build on the knowledge generated in previous innovation trials such as (but not limited to):

- THOR Hammer
- Vonaq Utility Pole Strength Measurement
- Ultrapole

This project will critically review these solutions and compare them against each other and new technologies, not yet trialled. This will include the outputs of these, and similar, projects using the information published by the lead licensees on the Smarter Networks Portal. Where additional information is required, we will work with the other networks to source the data required for a holistic review of pole assessment technology that utilises the learnings from earlier investments.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

Previous projects which addressed the same problem statement – seeking to deliver a CNAIM 2.1-compliant methodology for wooden pole asset health assessment – have not resulted in a commonly accepted approach across DNOs. This project seeks to utilise previous learnings to provide DNOs with a holistic overview of available condition assessment strategies and technologies. The project trials two novel solutions that seek to address challenges to adoption.

Having reviewed the Smarter Networks Portal for similar works, there are no examples of the two solutions within the scope of this project having already been trialled on GB networks. To the best of our knowledge, this is the first project of its kind to investigate the suitability of pole mounted sensors for detection and deterrent of woodpecker-related asset deterioration.

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

Whilst other projects have looked to address the same problem statement, there has been no conclusive result that has resulted in widespread adoption of new approach to pole condition assessment across DNOs. This project seeks to take a holistic view across existing works and compare them current practices. At the same time, we propose to introduce and demonstrate the suitability of two new solutions. This includes a remote health monitoring solution has not been previously trialled in the UK, having been developed and trialled principally in Norway for the detection and deterrent of woodpecker damage.

Relevant Foreground IPR

N/A

Data Access Details

Access to this data must be requested by contacting innovation@spenergynetworks.co.uk. Please provide the following information in your request:

- Affiliation, position and contact details of requesting party
- Relevant project and type of data required
- Reasons for requesting this data and evidence that this data will be used in the interest of the UK network electricity customers
- How data will be shared internally and externally by the requesting party

Any data request deemed unsuitable for sharing will be highlighted to the appropriate requesting party. After receiving the request we will provide the estimated date for completing the data provision based on other requests and our team workload at that time. All requested data remains the property of SP Energy Networks.

Data Sharing Policy

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

SPEN is not funding this as part of its business-as-usual activities to avoid disruption to our BAU overhead line programmes. Using innovation funding will enable us to conduct these trials without diverting significant resource away from BAU delivery and allow us to improve confidence in the technologies being assessed before considering a BAU rollout.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

The business case for deploying the solutions being reviewed and assessed in this project is currently unproven – in particular, the commercial viability of pole mounted monitoring solutions that require a significant number of device deployments to be effective. This

project seeks to de-risk investment in these types of solutions through the use of NIA funding so that networks can understand how, where and when to deploy these solutions for maximum network and consumer benefit. For both solutions, in-field and remote, there is a need to validate that the results are reliable and can be adequately translated into CNAIM-compatible measurements before they can be deployed into BAU operations.

This project has been approved by a senior member of staff

☑ Yes