

# Energy Networks Innovation Process Annual Project Progress Form



Notes on Completion: Please refer to the NIA Governance Document to assist in the completion of this form.  
Do not use tables

## Step 1 - Initial Project Details

### Project Title

HV Pinpoint

### Project Reference

NGED\_NIA\_074

### Nominated Project Contact(s)

Ryan Huxtable

### Project Start Date

03/24

### Project End Date

10/25

### Scope (15000 Characters max)

The scope of this project is to pursue the research and development of a set of low TRL technologies, tested in lab, trial network and live network environments, which may be used as an integrated pre-fault management system within a novel methodology for pinpointing HV pre-fault defects on NGED's underground network. The method will use sensors capable of detecting phase-to-phase and phase-to-earth pecking events, which don't require substation Current Transformers (CTs) and can be installed and operated non-invasively without the need to break apart switchgear end-boxes. Novel street level devices will be developed for validating and pinpointing defects. The system will be applicable to three-ended circuits and not rely on test van based techniques, providing an alternative to PD mapping for precise cable defect location. This method may be used in conjunction with existing pre-fault systems, such as Pre-Fix, or as a standalone method.

This project generates direct benefits by providing a more practical and cost-effective alternative to PD mapping. Additionally, this new capability is intended to unlock the full benefits of a pre-fault capability in general, for example being used to provide a pinpointed defect location from a broader location given by Pre-Fix methods. These benefits are captured through a reduction of fault management costs through operational savings and reduced IIS penalties, improved customer service through reduced CIs/CMLs and an improved basis for targeted asset replacement through improved visibility of the condition of the HV underground network. Customers will benefit from an increased reliability of supply, improved value for money and protected availability of supply to meet the increasing demand required for the uptake of LCTs.

### Objective (15000 Characters max)

- Develop 3-phase online HV cable sensors capable of detecting phase-to-phase and phase-to-earth pecking events, which don't require CTs
- Develop a Pulse Injection Generator (PIG) which can be used to validate event location
- Develop a sensor mat that can pinpoint events from street level
- Test the developed devices in lab, trial network and live network environments
- Combine the developed devices into an integrated system which can be used for end-to-end pre-fault management
- Develop a system that works on three ended circuits
- Develop the system in a way that can be installed and operated non-invasively, without needing to break apart switchgear endboxes, which can be used with a range of cable/switchgear types
- Develop a portable system not reliant on test van techniques
- Improve understanding of the cost of the devices and the operational cost of the method, and how this could be scaled to rollout across NGED/other DNOs

### Success Criteria (15000 Characters max)

This project will have been successful if the following outcomes are achieved:

- Demonstration of the validated location of partial cycle and full cycle HV pecks using the prototype system elements developed in this project as an integrated fault management system
- Demonstration of repeated accuracy on a live system, including circuits with high background harmonic noise and switching noise
- Demonstration that sensors can detect pre-faults that are phase to phase, phase to earth, and all varieties of pre-faults that have activity in three phases
- Demonstration of reporting to a standalone data system with a web interface
- Demonstration of non-invasive live installation and operation of equipment on NGED's network, which is widely applicable e.g. effective on a range of HV cable types and switchgear
- Production of optimised user and design requirements for each of the prototypes developed as well as the whole system
- An improved understanding of the business case of using this method as a pre-fault capability within DNOs, either in conjunction with other pre-fault systems such as Pre-Fix or as a standalone method, and determining the next steps towards larger scale volume rollout of the systems

## Step 2 - Performance Outcomes

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

Details of how the Project is investigating/solving the issue described in the NIA Project Registration Pro-forma. Details of how the Project is performing/performed relative to its aims, objectives and success criteria. (15000 Characters max)

HV Pinpoint was mobilised following contract signature in March 2024 in line with the original project plan and timescales. For this reason, under one month of work has been carried out during this reporting year. Work has started on the development of novel sensors and street level devices, with some long lead time items ordered. Work has also been carried out on updating the webserver ahead of its use in the test and trial phases of the project.

Further information on the projects progress towards its aims, objectives and success criteria will be provided in the following annual reports.

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

The Network Licensee should state any changes to its planned methodology and describe why the planned approach proved to be inappropriate. Please confirm if no changes are required. (15000 Characters max)

No changes required

### Lessons Learnt For Future Projects

Recommendations on how the learning from the Project could be exploited further. This may include recommendations on what form of trialling will be required to move the Method to the next TRL. The Network Licensee should also state if the Project discovered significant problems with the trialled Methods. The Network Licensee should comment on the likelihood that the Method will be deployed on a large scale in future. The Network Licensee should discuss the effectiveness of any Research, Development or Demonstration undertaken. (15000 Characters max)

Learning from the project will be reported in subsequent annual progress reports.

Outcomes of the Project

When available, comprehensive details of the Project's outcomes are to be reported. Where quantitative data is available to describe these outcomes it should be included in the report. Wherever possible, the performance improvement attributable to the Project should be described. If the TRL of the Method has changed as a result of the Project this should be reported. The Network Licensee should highlight any opportunities for future Projects to develop learning further. (15000 Characters max)

Outcomes of the project will be reported in subsequent annual progress reports.

Step 3 - Outputs And Implementation

Data Access Level & Quality Details

A description of how any network or consumption data (anonymised where necessary) gathered in the course of the Project can be requested by interested parties. This requirement may be met by including a link to the publicly available data sharing policy. (15000 Characters max)

Data generated in later stages of the project will be made available at [nationalgrid.co.uk](http://nationalgrid.co.uk)

Foreground IPR

A description of any foreground IPR that have been developed by the project and how this will be owned. (15000 Characters max)

No foreground IPR developed during March 2024.  
Standard NIA IP terms were agreed for this project and will be applied to all IP generated later in its lifecycle.