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## NIA Project Registration and PEA Document

### Date of Submission

Apr 2026

### Project Reference Number

NIA\_UKPN0121

## Project Registration

### Project Title

Pathways

### Project Reference Number

NIA\_UKPN0121

### Project Licensee(s)

UK Power Networks

### Project Start

April 2026

### Project Duration

1 year and 0 months

### Nominated Project Contact(s)

Mubinur.Zidan@ukpowernetworks.co.uk

### Project Budget

£449,599.00

## Summary

UK Power Networks seeks to improve network reliability for Worst Served Customers, requiring an increase in network improvement projects. Whilst these improvement schemes already take place, they are often slow to deliver, and planners are required to manually analyse numerous datasets and key factors, such as the impact of site works on customer vulnerability or consenting requirements, to deliver efficient schemes. To overcome these constraints, the project will trial two tools: a proactive multi-criteria tool to prioritise network interventions across the network, and an opportunistic tool that gives planners relevant, area-specific insight during detailed design. Together, these tools will improve data insight, accelerate scheme development, and enable more holistic and efficient investment planning, leading to network reliability improvements for all customers including worst served.

### Nominated Contact Email Address(es)

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## Problem Being Solved

DNOs are committed to improving network reliability for their Worst Served Customers (WSC). Reaching as many WSCs as possible requires a major uplift in the volume of WSC interventions, yet current network improvement processes do not allow for holistic design at this scale.

Traditional reinforcement schemes often take two or more years to complete. Along with these delivery times, planners lack easy to access visibility of multiple data sets as part of a spatial detailed design process. As a result, opportunities to maximise benefits for customers are often missed when the distribution system is not being reviewed at a holistic level.

This creates a fundamental bottleneck: DNOs, including UK Power Networks, must plan, prioritise, and deliver many more schemes more efficiently to enhance the reliability of the distribution network. Without effective tools to harness this capability, planners cannot gain the network insight needed to accelerate scheme development and improve decision making.

## Method(s)

Two solutions will be developed through the project:

- Proactive solution

This tool will be developed to run region-wide analyses and will produce two outputs:

§ Determination and analysis of automation zones – Datasets, including the connectivity information, node-edge topology model, substation circuits, and switching and automation data, will be used to assign each substation to an automation zone and define how these zones connect. Once the zones are established, fault data will be analysed automatically to identify faults affecting multiple zones, areas that would benefit most from additional automation, and locate fault-prone sections within zones, depending on data quality.

§ New connections between substations – Using the analysis conducted, the tool will propose network interventions to resolve fault issues and reduce customer interruptions. The interventions proposed will be connections between substations with poorer reliability and nearby reliable ones. Fault clusters will be analysed using connectivity and switching data to propose feasible interconnections. Two routing approaches will be tested: direct connection and road connection.

Other interventions may be proposed, such as reconductoring or undergrounding existing cables, using the various data gathered. However, the ability for the tool to identify these prospective schemes is dependent on the quality and completeness of the datasets. This will be explored in Phase 2.

- Opportunistic solution

This tool will be developed for Planners to run localised analyses to support day-to-day scheme planning. It will provide planners with the same analysis performed as part of the proactive tool but limited to the network area they are working on. This will include summaries of the number of WSC and PSR customers in the area they are working. The tool will be developed so that additional datasets can be added later when made available, such as relevant asset information (e.g. aging assets), allowing users to view even more relevant information. Third-party datasets will also be included in the tool, which may be relevant in some cases depending on scheme location. These datasets are likely to include flood zones and nature designations such as areas of outstanding natural beauty, sites of special scientific interest and nature reserves.

Results from the execution of the tools will be compiled into automatic reports using Power Automate and made available for further use in other tools.

### Data Quality Statement:

The project will take into consideration data quality when building the solution. The information provided by the solution is intended to be used to make decisions around network investment. Therefore, data accuracy is essential in ensuring the solution is able to deliver the desired benefit. The project will carry out a data risk assessment and, once the solution has been rolled out into BAU, intends to review and update all data periodically.

## Scope

This project will be delivered in three phases. The approach is outlined below.

### Phase 1

- Investigation of available internal datasets and system architecture.
- Investigation of external datasets that could compliment the project outputs.
- Engagement with internal stakeholders to define solution requirements and approach for development and implementation into BAU.

### Phase 2

- Tool development – The development will be iterative combined with the testing and user trials (below). The tools will be continuously improved to ensure they meet the requirements whilst being user-friendly.
- Tool testing – The tools will be tested alongside development.
- Tool trials with UK Power Networks users – After the tools have been tested, they will be trialled with end-users and assessed on whether they provide benefit.

### Phase 3

- Documentation and training materials – The solution architecture and training material (e.g. a how to use guide) will be documented to support the transition to BAU and assist end-users when using the tools.
- End-user training – Training sessions with end-users on how to use the tools.
- BAU handover and rollout – The tools will be handed over to UK Power Networks alongside all documentation. IS will integrate the tools into UK Power Networks' systems and roll the tools out, allowing Planners (and other end-users) to utilise them.

The project partner will be responsible for conducting majority of the work outlined above, including all development. UK Power Networks will be responsible for providing the datasets required, the BAU handover and rollout activities and the end of Phase 3. UK Power Networks will also provide input/steer during tool development to ensure it aligns with business needs. Both parties will work together to conduct the end-user trials at the end of Phase 2.

## Objective(s)

The objective of the project is to develop tools to assist and enable the coordinated assessment and planning of interventions that provide network performance and WSC reliability improvements.

There are four sub-objectives that contribute to a successful project delivery:

- Develop the tools to help Planners create schemes focused on both network performance and WSC reliability improvements
- Trial the tools with UK Power Networks' end-users, receiving positive feedback on tool features and functionality
- Create training materials and conduct training sessions for end-users so that they are confident and comfortable with using the tools
- Create a BAU plan for the tools, integrate into internal systems and rollout for use across the business

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The outputs of the project will be used by UK Power Networks' planners to assist with scheme planning and improve network performance in these areas. The solution will promote schemes to include easier consideration of WSCs and vulnerability factors to ensure that network investment will be impactful for customers who are vulnerable or at risk of experiencing frequent supply interruptions.

### Success Criteria

The project will be deemed a success if:

- The solution is fully developed and tested
- The user trials generate meaningful technical and operational learnings, including insight into the impact of the solution on WSC enhancement schemes and limitations of the solution
- The solution improves scheme planning, therefore making the overall planning of a WSC scheme more efficient
- The learnings captured provide actionable recommendations for future development work

### Project Partners and External Funding

This project will be delivered in partnership with Gutteridge Haskins & Davey Limited (GHD), who will develop the proposed solution. The project will be NIA funded and is not receiving any external funding from either the project partner or any other sources.

### Potential for New Learning

The project will identify easy-win opportunities resulting in enhancing existing processes and network optimisation to support work to improve the network reliability for WSCs. The following key learnings are expected:

- Understanding of datasets: Through the project, there will be an increase in understanding of the quality of internal data available. The project will identify areas where data is lacking. Paired with third-party datasets, the project will produce key findings for users (network planners) to help them with their roles and responsibilities.
- Development of digital solutions: The development team will gain insight and experience in creating a data-driven solution.
- BAU implementation: By the end of the project, the project team will understand how the solution will be deployed in BAU operations, i.e. how the tools will be utilised day-to-day to assist with scheme planning, and how they will interact with existing procedures.
- WSC and network investment quick wins: The outputs of the project (the tools) will identify areas of the network where optimal and efficient network investment can be undertaken, resulting in an improvement to WSC reliability.

The results of the project will be documented and shared with key stakeholders.

### Scale of Project

This is a software project. The investment will enable the development, trial and deployment of the solution into UK Power Networks' BAU operations to assist with network investment and scheme planning. Due to the distribution network topology, all customers qualifying as worst-served fall within either the EPN or SPN licence areas. The solution will be developed to include these licence areas and will take input from these licence areas during development to ensure acceptance.

The scale of investment aligns with the potential benefits. If the project were of a smaller scale (e.g. focusing on one licence area or developing one of the tools as the solution rather than both) the ability to identify areas where high faults and load-related network investment coincide would be limited. Therefore, the expected benefit of improving WSC reliability would be reduced because many potentially suitable areas (for network investment and WSC improvements) would be overlooked.

### Technology Readiness at Start

### Technology Readiness at End

TRL3 Proof of Concept

TRL8 Active Commissioning

## **Geographical Area**

User trials will be conducted in UK Power Networks offices in the EPN and SPN regions, the exact locations will be determined during the project.

## **Revenue Allowed for the RIIO Settlement**

No funding was provided within the current RIIO-ED2 settlement that will become surplus to requirements because of this project.

## **Indicative Total NIA Project Expenditure**

The total expenditure that UK Power Networks expects to incur for this project is £449,599. Of this, 90% (£404,639) will be recovered from NIA expenditure and the remaining 10% (£44,960) will be contributed by UK Power Networks.

## 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:

The project will enable a more efficient network investment planning and delivery process which will facilitate the energy system transition by facilitating the more efficient planning of schemes to improve UK Power Networks' reliability of power supply. Through the outputs of the project, schemes will be efficiently planned improve the quality of supply for those customers and remove a potential blocker to them participating in the energy transition.

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

The project will enable a more efficient network investment planning and delivery process. There will also be more insight into vulnerability factors when planning these schemes through the outputs of the project. The result is a faster delivery that improves network reliability for consumers in vulnerable situations.

### 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

The base case is that there is no methodology. Planners have limited visibility when planning network investment schemes which leads to potentially suboptimal solutions. Therefore, the base cost is £0.

Through optimal identification of fault areas, and through quick and easy access to an array of data including WSC data and vulnerability factors, network investment schemes will be more efficiently planned to improve the reliability of the network. The ongoing cost of the solution is £5k per annum.

The method case brings about benefits in the form of reduced Customer Interruptions (CI) and Customer Minutes Lost (CML). By the end of ED3 (6 years of benefits), the project estimates a total of 569,506 CIs and 967,935 CMLs avoided for WSCs.

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

All GB DNOs apart from LPN have WSCs so the solution could be rolled out to each of them. The quality of the solution will depend on the quality of each DNO's internal datasets.

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

The indicative cost of rolling out the solution is £200k per DNO group. This is based on previous experience of rolling out software solutions. The cost is highly dependent on the quality of internal datasets.

### 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

The project will develop GIS tools to identify and highlight WSC data in areas where network investment schemes are being planned. The project will document the process taken to reach the solution, including datasets utilised, so other DNOs can replicate the process. This will allow the other DNOs to assess their network and plan investment schemes with greater consideration for WSCs.

#### 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.

We have not identified any other NIA projects (live or completed) that have looked at improving scheme planning through an automated GIS tool.

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

N/A

### Additional Governance And Document Upload

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

Automated geospatial tools have not previously been integrated into scheme planning operations. The use of automation to analyse

data and identify optimal network investment opportunities to improve WSC reliability has, to the best of our knowledge, not been done before in GB. The project is innovative as it will be the first to trial and implement a geospatial tool for network planning and scheme development.

## **Relevant Foreground IPR**

The project will generate foreground IPR in the form of digital tools to help plan network investment schemes that impact WSCs. Along with this, the project will produce training materials for use of the tool.

GHD is bringing their background IPR in the form of their existing experience in creating solutions using an array of datasets and data integration and manipulation tools. Use of the relevant foreground IPR generated in this project will require access to this background IPR.

## **Data Access Details**

Where appropriate, de-sensitised data and non-confidential findings will be made available to interested parties in alignment with our Data Sharing Policy. UK Power Networks recognises that Innovation projects may produce network and consumption data, and that this data may be useful to others. This may be shared with interested parties, whenever it is practicable and legal to do so, and it is in the interest of GB electricity customers. In accordance with the Innovation Data Sharing Policy, UK Power Networks aims to make available all non-personal, non-confidential-sensitive data on request, so that interested parties can benefit from this data.

To view the UK Power Networks' Innovation Data Sharing Policy, please visit the website here:

<https://innovation.ukpowernetworks.co.uk/>

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

The project aims to develop and trial a new and innovative GIS solution that requires development, testing, validation and integration work. This goes beyond the scope of routine system enhancements. In addition, the solution carries a technical and operational risk in its ability to integrate with/into existing systems and therefore cannot be funded as part of BAU activities.

## **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 NIA funding mechanism will enable UK Power Networks to investigate the feasibility of a novel solution before committing to wider BAU deployment. The proposed solution has several risks associated with its deployment and effectiveness. For example, there is a technical and operational uncertainty around the solution's ability to integrate with existing internal datasets, systems and operational workflows that must be validated through trialling.

## **This project has been approved by a senior member of staff**

Yes