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

May 2026

Project Reference Number

NIA_SPEN_0127

Project Registration

Project Title

LV Evo – Evolution of LV Network Management

Project Reference Number

NIA_SPEN_0127

Project Licensee(s)

SP Energy Networks Distribution

Project Start

June 2026

Project Duration

1 year and 9 months

Nominated Project Contact(s)

Andrew Woods

Project Budget

£2,050,000.00

Summary

LV Evo seeks to develop an intelligent network management system for the low‐voltage (LV) electricity networks serving homes and businesses. Traditionally, LV networks have limited visibility and are managed reactively; this project introduces a data‐driven apporach that integrates smart meter data, LV monitoring, and existing analytics into a single operational view.

The system will enhance network visibility, automate fault detection and response, and enable remote control of assets such as voltage regulators. It aims to transition LV networks from passive infrastructure to actively managed DSO systems, improving reliability, safety, and operational efficiency.

By enabling smarter control and faster decision‐making, LV Evo will support increasing demand from low‐carbon technologies such as electric vehicles, heat pumps, and distributed generation while reducing costs for customers.

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

The project addresses the growing need for systematic and controlled procedures within the LV distribution network due to the increasing uptake of low carbon technologies, electric vehicles (EVs), and photovoltaic systems (PVs). Networks' ambition to enhance visibility and controllability of the LV network requires a real-time LV network management platform. The challenge is developing the capability to utilise existing LV analytics and insights from smart meters and substation monitors to inform operational decision-making and control in real-time. To fulfil DSO responsibilities, network operators need to evolve their LV management approach from a reactive, incident management model towards a proactive model similar to what already takes place at higher voltages. Eventually, a DSO must be capable of leading LV switching activities, deploying flexibility services, intelligently responding to LV incidents, and

controlling LV devices remotely. The current gap hinders efficient LV operation activities, timely customer supply restoration following LV faults, and maintenance of supply quality.

Method(s)

The project will deliver a solution through design, development, integration and validation of a new LV Network Management platform to enhance LV operation capabilities and support evolving Distribution System Operator (DSO) capabilities.

The solution involves several key steps:

- Integration with Existing Tools: The project will demonstrate how networks' own LV analytics capabilities can be integrated with commercial platforms to achieve cost-effective solutions and avoid duplication. Demonstrating how LV management can be integrated with existing HV SCADA systems for a holistic network management approach.
- Cybersecurity Architecture: The project will address cybersecurity requirements and risks associated with integrating IT and OT interfaces. This includes developing a cyber-secure architecture that enables communication and orchestration across IT/OT infrastructure.
- Control Algorithms and Voltage Control: Algorithms and control strategies will be developed for using LV monitoring data and smart meters for autonomous LV voltage control by LV controllable devices (e.g., VRDT, STATCOM).
- Development of LV Network Schematic: An approach will be developed to convert connectivity models of the LV network into a schematic suitable for operational decision-making.
- Live Trials to de-risk the evolution from incident management to LV orchestration: Procedures will be established for managing incidents, updating network connectivity, and fault finding. We will seek methodologies that can automate these practices rather than purely relying on human intervention resulting in optimising use of resources.
- Demonstration and Roadmap: The system's functionality will be demonstrated, and a roadmap for the next stage of development will be produced. The demonstration will be conducted on SPM and SPD to maximise the success of future business-as-usual integration phases.

Scope

This project includes the development and implementation of an LV Network Management System (LV NMS) to enhance SPEN's LV operation capabilities and to provide foundations for LV functions required to support SPEN's DSO vision. This project is envisaged to answer the uncertainties and innovation aspects of a SPEN LV NMS system where the scope covers the following:

- Defining technical and functional requirements of LV NMS system focusing on priorities functions and high impact use cases. This activity includes extensive internal stakeholder engagement e.g. customer services, HV control room, Digitalisation, Flexibility team, Operations etc
- Review of existing LV incident control model and considering how roles, responsibilities and processes might need to evolve in a future LV operating model.
- Market research to identify suitable platforms, then procurement and appointing the project partner. Considering the response from market considerations may be needed to progress.
- Design and implementation of IT/OT system architecture, with consideration on data analytics and data residing in IT can inform the control settings in OT network.
- Develop and implement automated methodology for generating schematic network connectivity
- Developing and implementing control algorithms for LV voltage control using analytics from smart meter and LV monitoring data
- Live trials of the developed solution to validate and explore barriers to scaling/BAU adoption.
- Demonstrating the system's functionality and producing the road map for next stage development. Demonstration will be on SPM and SPD to maximise the success of future BaU integration phases.
- Cost benefits associated with voltage control strategy and integration with NMS. Integrated voltage control into an LV NMS reduces reinforcement costs by optimising network capacity and avoiding expensive physical upgrades. It also lowers operational costs through improved asset utilisation and reduced energy losses.

Objective(s)

The objectives of this project include:

· Establishing an LV NMS platform to improve visibility and controllability of future LV networks.

· Enable integration with existing SPEN smart tools to optimise decision making and avoid duplication of functionalities.

· Explore how an LV NMS can support LV network operations, including LV switching activities, flexibility service deployment, incident management and LV device control

· Improve customer service by enabling faster supply restoration following LV faults and maintaining quality of supply

· Deliver a roadmap for future development and BaU integration following successful demonstrations.

Consumer Vulnerability Impact Assessment

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 will look to improve the exchange of information between networks and customers while reducing the number of disruptions to them in the home. Other considerations, including the projects' impact on supply, immediate health, and safety in the home, have been made in carrying out this assessment.

Success Criteria

LV Evo will be classed as a successful project if the following criteria are achieved:

1. LV NMS Development and Deployment: A fully functional LV Network Management System is designed, implemented, and demonstrated within SPEN's LV network environment.

2. Technical and Functional Requirements: All defined priority functions and high impact use cases are delivered and validated through stakeholder engagement.

3. Integration with Existing Tools: Successful interoperability with SPEN's smart tools (NAVI, NetView) and HV SCADA system without duplication of functionalities.

4. Operational Improvements: Demonstrated capability for LV switching, LV incident management, and LV device control.

5. Customer Service Impact: Benefits realisation plan developed to measure improvement in key metrics, such as LV fault restoration times and improved quality of supply for customers.

6. Data and Analytics Utilisation: IT/OT architecture implemented with effective use of smart meter and LV monitoring data for operational decision making, including voltage control algorithms.

7. Demonstration and Roadmap: System functionality demonstrated on SPM and SPD networks, with a clear roadmap for business-as-usual integration and future development.

8. Procurement and Market Engagement: Completion of market research, evaluation and platform selection, and partner appointment.

Project Partners and External Funding

N/A

Potential for New Learning

This project presents a significant opportunity to generate new learning for electricity networks. The implementation of a LV NMS addresses current gaps in LV network visibility and controllability, across the industry as well as supporting the transition from DNO to DSO model. The outcomes will inform future operational strategies, technology integration and future consumer benefits for all networks. The following list details key learnings from the project.

1. Integration Feasibility: The ability of a LV NMS system to integrate securely with existing IT/OT systems will provide new learnings. This includes identifying interoperability standards and technical challenges that influence scalability and CNI security.
2. Operational Enhancements: Improvements in LV network operations enabled by LV NMS, such as faster fault restoration, proactive voltage control, and flexibility service deployment. These enhancements define the shift from reactive to proactive LV management.
3. Process adaptation: Understanding of how operational processes, roles, and responsibilities may need to evolve to support real-time LV orchestration. This learning focuses on adapting incident management, switching activities, and control room procedures for a digitalised LV environment.
4. Data-Driven Control: The use of smart meter and LV monitoring data to enable automated voltage control and informed decision-making. This involves validating algorithms and strategies that underpin dynamic, data-driven network operations.
5. Market and Cost analysis: An evaluation of the commercial viability and scalability of LV NMS solutions. This includes procurement strategies, cost-benefit analysis, and insights to support robust business cases for industry-wide adoption.

Scale of Project

The scale of the project will be limited to two “District” areas – these are geographical subdivisions of the SP Manweb and SP Distribution licence areas. This will allow us to test the approach on two networks which have their unique operating and design principles whilst limiting the overall scale. This will support future scale-up within SPEN as a BAU initiative and will also inform adoption by other networks.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The project will seek to demonstrate the system in the SP Manweb and SP Distribution licence areas.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

£2,050,000

Project Eligibility Assessment Part 1

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

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

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

The project directly supports the transition to a smarter, more flexible energy system by enabling Distribution Network Operators (DNOs) to actively monitor and manage low-voltage networks in real time. This capability is critical as the energy system evolves to accommodate:

1. Rapid electrification of heat and transport: Increased uptake of electric vehicles (EVs) and heat pumps creates significant new demand at the LV level, where visibility and control are currently limited.
2. Integration of distributed energy resources (DERs): Growing volumes of rooftop solar, battery storage, and other DERs introduce bidirectional power flows and voltage variability that traditional passive networks cannot manage effectively.
3. Enabler for local flexibility markets: LV NMS will provide accurate network data and operational control, enabling DNOs to procure flexibility services and avoid costly reinforcement, reducing overall system costs.
4. Support for net zero targets: By improving LV network resilience and capacity management, the project accelerates the deployment of low-carbon technologies and ensures that customers can connect these assets without unnecessary delays or prohibitive costs.

In short, LV Evo transforms the LV network from a passive asset into an actively managed system, underpinning the digitalisation and decarbonisation objectives of RIIO-2 and the wider energy transition.

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

n/a

Please provide a calculation and/or description of the expected benefits of the solution

Reduced CI/CML: The NMS platform will support LV operations management and support incident controllers to respond to incidents faster and with a more holistic understanding of the network and possible actions they can take.

Improved QoS: Automated control of OLTC devices will enable corrective action to be taken to address voltage issues, improving Quality of Supply for our customers.

DSO Enabler: Establishing the foundations of an LV NMS platform upon which further DSO functions can be built – including flexibility dispatch and LV control/automation.

Improved Safety: Increased visibility of LV grid state and temporary actions allows workers to be confident that assets are safe to work on.

O&M cost reduction: Increased visibility allows for faster fault location/restoration and proactive maintenance based on risk rather than schedules.

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

The proposed concepts will be replicable across all of GB electricity distribution networks. LV visibility, controllability and operational management is relevant to all DNOs as they manage the increasing uptake of Low carbon technologies. The specific sites that this technology could be applied to will depend on the functionality of equipment to support remote operations and monitoring controls.

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

Costs for GB-wide rollout will vary depending on network configuration and existing design of network management systems at each DNO. The project will develop an increased understanding of the rollout costs.

Requirement 3 / 1

Involve Research, Development or Demonstration

Projects 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

Involve Research, Development or Demonstration - Please select all that apply

☐ 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 LV Evo project will generate new learning in several critical areas that can be applied across all Electricity Distribution licensees:

- Integration with Existing IT/OT Systems: The project will develop approaches for integrating LV NMS with SCADA, ADMS, and flexibility platforms, creating replicable architectures for other licensees.
- Data Models and Interoperability Standards: By defining data requirements and ingestion processes for LV network models, the project will contribute to industry-wide standards for digitalisation and interoperability.
- Operational Use Cases: Insights from live trials – such as voltage management, fault detection, and flexibility dispatch – will provide evidence for how LV NMS can reduce reinforcement costs and improve reliability.
- Cost-Benefit Analysis and Deployment Strategies: The project will produce a robust business case and deployment roadmap, enabling other licensees to assess scalability and investment decisions.

All findings will be shared through industry forums, ENA working groups, and Ofgem reporting channels, ensuring that the learning is accessible and actionable for all DNOs.

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. Networks must explicitly mention similar projects that they have considered and how these differ.

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

The project has been presented at the ENA Electricity Innovation Managers forum to confirm with other network operators that this project does not duplicate existing work.

In addition, SPEN has engaged closely with other DNOs and iDNOs including SP ENW and GTC to understand related activities that each are carrying out to confirm this project is not duplicative.

The project is novel in its approach to addressing the convergence of IT and OT technologies – as most LV management activities have focussed on increasing monitoring and visibility to date. This project seeks to build on earlier and ongoing work that have supported deployment of increasing number of LV monitoring devices. This project seeks to establish a platform that will leverage that previous innovation and bring make use of the growing data available for LV networks – providing a means to use those insights for real-time operational decisions. This represents a step-change in how DNOs operate their LV networks which have historically been managed.

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

This project shares similarities with ENWs Quest project by exploring voltage control techniques. However, this project addresses a different challenge focusing on the development of a LV NMS whereas QUEST focuses on holistic voltage control across HV and LV networks, voltage optimisation strategies and addresses voltage control coordination.

Smart Street Rural is a similar project that has the shared theme of voltage management and flexibility however it focuses on the feasibility of applying conservative voltage reduction (CVR) to overhead networks fed by pole-mounted transformers.

Both projects address LV challenges but focus on different aspects but we will leverage learnings from both where applicable.

Additional Governance And Document Upload

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

The project is innovative because it introduces LV network management capabilities that do not exist, or are disjointed, in current business-as-usual operations. Today, LV networks are largely passive, with limited visibility and no real-time control. This project will:

- Deploy a system that brings insights from a growing network of LV monitoring and control devices to inform operational decision making.
- Develop new digital architectures and interoperability for LV systems.
- Explore process for a future LV network operating model, enabling proactive incident management and establishing the foundations for more integrated flexibility services.

Relevant Foreground IPR

Relevant Foreground IPR will be identified continuously during the project lifecycle and documented accordingly.

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.

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

An LV NMS solution is not yet proven at scale, and its business case carries significant uncertainty. Key unknowns include:

- The technical feasibility of integrating LV NMS with existing IT/OT systems and application to operational decision making and control.
- The operational benefits and customer impacts under real-world conditions.
- We must manage the risk to CNI from a cyber security perspective at the interface of IT and OT systems, including potential vulnerabilities in data exchange, remote control interfaces and system orchestration.

Because these factors introduce risk, the project cannot be justified under BAU investment criteria without first demonstrating its effectiveness through a controlled trial.

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 project entails several risks that require innovation funding support:

- Technical Risk: Integration of LV NMS with existing systems and validation of real-time control functions are unproven. There is also a risk that the deployment of such a system can have detrimental effect on the performance of existing LV incident management systems and HV control – this project will allow us to de-risk this in a controlled environment.
- Operational Risk: Introducing active LV management could impact network performance if not carefully tested. Moving away from the current operating practices for LV network requires us to carefully assess the health and safety implications for staff and consumers.
- Commercial Risk: The cost-benefit case for LV NMS is uncertain, and large-scale deployment could require significant investment. Innovation funding enables us to demonstrate the proof-of-concept and address uncertainties without committing to a full scale rollout. This approach also ensures other network licences benefit from the learnings.

NIA funding enables the licensee to explore these risks in a structured, low-regret manner, generating evidence to inform future regulatory and investment decisions.

This project has been approved by a senior member of staff

☑ Yes