

NIA Project Registration and PEA Document

Date of Submission

Feb 2026

Project Reference Number

NIA_SSEN_0082

Project Registration

Project Title

Lancet

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Project Licensee(s)

Scottish and Southern Electricity Networks Distribution

Project Start

February 2026

Project Duration

0 years and 6 months

Nominated Project Contact(s)

Rob Britton

Project Budget

£100,200.00

Summary

Currently, PCB (Polychlorinated Biphenyl) testing in Pole Mounted Transformers (PMTs) requires an outage for oil sampling, and potentially a second outage for replacement of the transformer. This approach increases disruption for our customers, cost, and environmental risk. With over 16,500 PMTs having been classified low-risk (Green) for contamination, still in service and PCB obligations continuing, future interventions must be more efficient and cost-effective across the SSEN network. This project will develop, certify, and integrate the Lancet tool, enabling safe oil sampling from energised PMTs without an outage. The project will deliver qualification testing, compliance certification, and a manufacturing plan for scale-up of Lancet. Lancet will accelerate testing, minimise outages, ensure targeted replacement of PMTs, and support environmental compliance, ensuring long-term resilience and cost savings for Distribution Network Operators (DNOs) while meeting regulatory obligations.

Third Party Collaborators

Steer Energy

Nominated Contact Email Address(es)

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Problem Being Solved

Polychlorinated biphenyls (PCBs) are a highly toxic product whose production was banned by the Stockholm Convention on Persistent Organic Pollutants in 2001. PCBs were once widely deployed as dielectric and coolant fluids in electrical apparatus, carbonless copy paper and in heat transfer fluids. Because of their durability, PCBs remained in use, although manufacture declined significantly since the 1960s. PCBs are both toxic and carcinogenic and their durability biochemistry means they persist in ecosystems.

The EU Persistent Organic Pollutants Regulation (POP Regulation) was recast in June 2019 to require that “Member States shall identify and remove from use equipment (e.g. transformers, capacitors or other receptacles containing liquid stocks) containing more than 0.005 % (50 ppm) PCBs and volumes greater than 0,05 dm³ (50 ml), as soon as possible but no later than 31 December 2025”. The EU POP Regulations were implemented in the UK in May 2020, with a deadline for compliance being the end of 2025.

SSEN Distribution successfully met the 2025 deadline to remove all Pole Mounted Transformers (PMTs) classified as high-risk (Red) for potential PCB contamination. All high-risk units have now been removed and replaced. Testing showed that only 16% of these assets were contaminated—meaning 84% could have safely remained in service. Across the SHEPD and SEPD licence areas, around 16,500 PMTs remain in operation and are classified as low-risk (Green), with PCB compliance obligations continuing beyond 2025, which will entail future sampling and testing.

Current oil sampling PCB testing in Pole Mounted Transformers (PMTs) requires a planned outage. If contamination is confirmed, a second outage is needed for removal, causing additional disruption, cost, and environmental risk. This process is inefficient given the scale of the challenge. The inability to sample energised PMTs drives potentially unnecessary replacements, increases customer interruptions, and adds operational complexity. A solution enabling safe, live-line oil sampling that would support cost-effective, targeted testing of PMTs is essential to minimise outages, reduce operational and capital costs, and ensure compliance with environmental legislation.

Method(s)

Project Lancet focuses exclusively on Phase 3 of the development of an oil sampling solution for energised Pole-Mounted Transformers (PMTs). Feasibility work (Phases 1 and 2) undertaken prior to this NIA project established a viable concept and produced a working prototype. Phases 1 & 2 were BaU funded by the collaborating DNOs.

The project will use a technical method focused on developing, certifying, and integrating an innovative tool for live-line oil sampling from energised Pole Mounted Transformers (PMTs) in a real-world environment. The approach includes:

- Design and Qualification Testing: Validate tool performance under operational conditions, ensuring compliance with safety and environmental standards.
- Certification: Secure approvals for live-line use through accredited testing bodies.
- Operational Integration: Develop procedures, training, and a manufacturing plan for business-as-usual deployment.
- Field Trials: Conduct controlled trials to confirm reliability and gather feedback for iterative improvements.
- This will support future adoption by others and help ensure consistency across the industry.

Data Quality Statement (DQS): - The project will be delivered under the NIA framework in line with Ofgem, ENA and SSEN internal policies. Data produced as part of this project will be subject to quality assurance to ensure that the information produced with each deliverable is accurate to the best of our knowledge and sources of information are appropriately documented. All deliverables and project outputs will be stored in our internal systems with appropriate backup and version management. Relevant project documentation and reports will also be made available on the ENA Smarter Networks Portal and dissemination material will be shared with the relevant stakeholders.

Measurement Quality Statement (MQS): - The methodology used in this project will be subject to supplier quality assurance regimes and the source of data, measurement process and equipment as well as data processing will be clearly documented and verifiable. The measurements, designs and assessments will also be clearly documented in the relevant deliverables and final project report made available for review.

Scope

The scope of this project is to develop, certify, and integrate an innovative tool that enables safe oil sampling from energised Pole Mounted Transformers (PMTs) without requiring outages or full unit removal. This is the third phase of the project, the first two phases have been jointly funded by UKPN and SSEN Distribution, which has developed a working prototype of the Lancet tool. Phase 3 will include qualification testing, compliance certification, operational integration, and preparation for business-as-usual deployment through a manufacturing plan and training programme. The working prototype has been well received by both UKPN and SSEN Distribution staff and has been shared with the other DNOs, who have all expressed interest. Phase 3 will help allow the prototype to be fully embedded and enable it to be fast followed by other DNOs.

Using the Lancet live-line sampling tool offers a significant reduction in operational time and disruption compared with traditional outage-based oil sampling. A Lancet sampling event, including site setup, controlled live-line access and retrieval of the oil sample, is expected to take approximately 1 hr. In contrast, a traditional sampling approach requires the PMT to be fully de-energised and re-energised, resulting in planned outages that typically last around 6 hours. Avoiding this extended outage window not only reduces the duration of on-site activity but also removes the need for switching operations, customer interruptions and associated outage

management processes. This creates a step-change in efficiency and enables sampling to be completed quickly and with far less operational impact. However, the primary benefit arises from being able to collect an oil sample on site, this ensures that only contaminated transformers are replaced, as current methods require the transformer to be removed from site for testing, this can result in potentially healthy transformers being replaced. These benefits have been estimated in Section 2.15.2.

Objective(s)

- Validate tool design and performance under live-line conditions.
- Achieve certification for operational use.
- Develop procedures and training for future roll out and potential adoption by other DNOs.
- Support compliance with environmental legislation beyond 2025.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

The proposed method will have a positive impact on consumers in vulnerable situations by reducing the frequency and duration of planned outages. By enabling oil sampling without de-energising Pole Mounted Transformers (PMTs), the project minimises disruption and improves service continuity for all consumers including those in vulnerable situations.

Technical: Enhanced network availability in rural and hard-to-reach areas where PMTs are common by reducing the need for risk of prolonged outages.

Financial: Reducing outage cost, and allowing targeted replacement of PMTs, driving efficiency for all customers including those in vulnerable situations

Wellbeing: Reduced stress and inconvenience associated with outages, particularly for customers with health or care needs.

The solution supports Ofgem's principles on fairness and inclusivity by ensuring that innovation benefits extend to those most at risk of harm from service interruptions. The field trials involved should not involve any direct interaction with customers or involve any outages.

Success Criteria

The Funding Licensee will evaluate project success against the following measurable criteria:

1. Technical Validation:
 - The live-line PCB sampling tool achieves full compliance with safety and environmental standards (Hazardous/Special Waste) (Environmental Protection (Disposal of PCBs) Regulations).
 - Successful completion of qualification testing under operational conditions.
2. Certification and Approval:
 - Tool to be designed in accordance with UK and EU Machinery and Radio Equipment regulations and comply with ISO 12100 and ETSI EN 300 328.
3. Operational Integration:
 - Development and implementation of training materials and procedures for field teams.
4. Performance Outcomes:
 - Demonstrate ability to sample energised PMTs without outages or oil leakage.
 - Reduction in potentially unnecessary PMT replacements.
5. Consumer and Environmental Benefits:
 - Quantifiable reduction in customer interruptions and outage durations.
 - Lower carbon footprint through reduced transformer disposals.
6. Knowledge Dissemination:
 - Publication of findings and data in accordance with Ofgem's NIA requirements.

Project Partners and External Funding

Project Partners:

- Steer Energy Solutions Ltd – Technical partner responsible for tool design, development, and certification.
- UK Power Networks (UKPN) – Collaborating Distribution Network Operator providing operational input and field trial support.

Lead Funding Licensee:

SSEN Distribution – Will fund the project through the Network Innovation Allowance (NIA).

Role of Partners:

- Steer Energy Solutions Ltd will deliver technical development, certification, and support for operational integration.
- UKPN will contribute to knowledge sharing, field trials, and potential BAU adoption.

External Funding:

No confirmed external funding beyond NIA at this stage. However, both UKPN and SSEN Distribution have self-funded the completion of the first two phases of the tool development.

Potential for New Learning

The project will generate significant new learning in the following areas:

- **Technical Knowledge:**
 - Development and certification of a live-line oil sampling tool for Pole Mounted Transformers (PMTs).
 - Best practices for safe sampling without outages.
 - Integration into operational procedures.
- **Operational Insights:**
 - Improved understanding of PCB contamination patterns across PMT cohorts.
 - Strategies for reducing unnecessary asset replacements and optimising intervention planning.
- **Regulatory and Environmental Compliance:**
 - Enhanced processes for meeting PCB obligations beyond 2025 while minimising environmental impact.

Dissemination Plan:

SSEN Distribution will share learning through:

- **Industry Events:** Utility Week Live (NEC) and ENA Summit 2026.
- **Webinars and Workshops:** Targeted sessions for DNOs and stakeholders.
- **Face-to-Face Engagement:** Meetings with external stakeholders and interested DNOs.
- **Public Reporting:** Publication of findings in accordance with Ofgem's NIA requirements.

Scale of Project

The scale of this project is justified by the operational, financial, and environmental benefits it aims to deliver. SSEN Distribution currently has 16,500 Pole Mounted Transformers (PMTs) classified as low risk (Green), which remain in service under statistical assumptions. PCB obligations do not end in 2025, meaning future interventions will continue for years. Without a sampling solution that can be used on live assets, these interventions will require outages or potentially result in unnecessary replacements, increasing costs and customer disruption.

The proposed investment of £100,200 for Phase 3 is proportionate to the potential benefits of avoided PMT replacements (estimated at £4,000–£7,000 per unit retained in operation due to acceptable oil sample results) and reducing outage-related costs. A smaller-scale project would limit testing, certification, and operational integration, reducing confidence in the tool and slowing industry adoption.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The project will be delivered within SSEN Distribution's licence areas, primarily focusing on rural and semi-rural regions where Pole Mounted Transformers (PMTs) are widely deployed. Initial field trials and operational integration activities will take place at SSEN Distribution sites in Southern England and the North of Scotland, ensuring representative conditions for live-line oil sampling.

The geographical scope ensures diverse network conditions are tested, supporting robust validation and enabling knowledge transfer across GB networks.

Revenue Allowed for the RIIO Settlement

There is no allowed revenue in the current RIIO settlement for this project.

Indicative Total NIA Project Expenditure

The total project expenditure is expected to be £100,200.

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 supports the energy system transition by introducing an innovative live-line oil sampling method that reduces outages and optimises asset management. By avoiding unnecessary transformer replacements, the solution minimises waste and carbon emissions, aligning with net zero objectives and environmental compliance obligations beyond 2025. It also enables more efficient use of existing infrastructure, reducing the need for costly reinforcements and supporting a resilient, sustainable network.

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

Consumers in vulnerable situations are disproportionately impacted by outages, particularly where there are health or care needs. This project reduces planned interruptions by enabling oil sampling without de-energising PMTs, improving continuity of supply. It also lowers operational and capital costs, helping to stabilise network charges and reduce financial burdens on all consumers, including those most at risk.

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)

Not applicable (this is a RIIO-2 project).

Please provide a calculation of the expected benefits the Solution

Without the ability to collect an oil sample using live methods involved arranging an outage to remove the existing transformer from site for testing and then disposal, with it being replaced with a new unit to maintain continuity of supplies for the connected customers. As the prevalence of PCBs is based on a statistical model, it is not possible to absolutely confirm its presence until the oil has been sampled, in many cases no PCB contamination is detected, however, the cost of the outage and replacement transformer have already been incurred.

- Based on previous performance, SSEN typically replace 3000 PMTs per year of which 84% were found uncontaminated after the oil sample is fully tested. Other DNOs are delivering similar outcomes
- Looking to the future, the population of potentially contaminated transformers will reduce as they are replaced, however, we still envisage several 100 to be replaced each year.
- The Base Cost for a single transformer replacement is typically between £4-7k each depending upon unit rating, site conditions, access etc. If it is conservatively assumed that 200 units per year are required, this could see a cost of between £800k and £1.4m per annum or up to £7m in a 5 year price control period.
- The method cost will see the implementation of the Lancet Tool at a cost of
 - New tooling / training etc across SSEN - £300k
 - Ongoing calibration and operation for 5 years - £300k
 - Total Cost £600k
 - Conservatively assuming only 60% of potential transformer replacements (i.e. 120 units) then avoided costs are between £2.4 and £4.2m

- Overall benefits are therefore between £1.8m and £3.6m over a five year period for SSEN alone, this would obviously increase if adopted by other DNOs. Assuming a similar population of PMTs across all other DNOs could see total benefits of over £18m in five years across GB.

- The trials proposed and the supporting work will deliver the evidence needed to validate the benefits case.

- Recipients: Consumers (lower charges and fewer interruptions), DNOs (reduced capital and operational costs), environment (lower carbon footprint).

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

The method is applicable to all GB networks using Pole Mounted Transformers. Estimated coverage: 100% of PMTs across GB (~100,000 units), making the solution highly replicable.

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

- Based on existing evidence tools will cost circa £15 - £20k with each licence area requiring around 10 units, therefore with some contingency and allowing for replacement units to maintain availability total equipment costs of up to £300k
- Training of operational staff plus ongoing calibration and repair of equipment circa £60k/annum i.e. £300k for five years.
- Assuming other DNOs hold similar PMT populations to SSEN and UKPN, a GBwide rollout—based on all 13 licence areas procuring 15 units each and undertaking equivalent training, process updates, and deployment activities—results in an estimated total implementation cost of up to £7.8 million over five years

We estimate that each licence area will require approximately 15 units. Across 13 licence areas, this equates to around 130 units in total, plus additional costs for training and competency development. LPN has been excluded as they have a limited population of PMTs.

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 provide practical knowledge on live-line oil sampling techniques, certification processes, and operational integration strategies. This learning can be applied by all GB Distribution Network Operators (DNOs) to optimise asset management, reduce

unnecessary transformer replacements, and minimise outages. It will also inform best practices for compliance with environmental PCB obligations beyond 2025, supporting industry-wide efficiency and resilience.

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 is unique in its scope and approach. No other NIA, NIC, IFI, LCNF, or SIF projects currently registered or completed address live-line oil sampling for Pole Mounted Transformers (PMTs). Existing methods require outages, which this project seeks to eliminate. A review of ENA's innovation portal confirms no duplication.

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

Not applicable – no similar projects identified.

Additional Governance And Document Upload

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

The project introduces a novel live-line oil sampling tool for PMTs, which has never been implemented at scale in GB networks. Current practice involves outages and full transformer removal, making this solution a step-change in operational efficiency and environmental compliance.

Relevant Foreground IPR

The project will generate Foreground IPR related to the design, certification, and operational methodology of the live-line oil sampling tool. Background IPR from Steer Energy Solutions Ltd will be required for manufacturing and deployment. The Default IPR position applies, ensuring open access for GB networks.

Data Access Details

For information on how to request data gathered in the course of this project, see SSEN Distribution's Network Innovation Competition (NIC) and Network Innovation Allowance (NIA) Data Sharing Procedure at <https://ssen-innovation.co.uk/innovation-strategy/>.

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

The solution is unproven at scale and requires certification, operational integration, and risk mitigation before BAU adoption. These activities entail technical and regulatory uncertainty, making NIA funding appropriate.

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 carries technical and operational risks, including live-line safety validation, compliance certification, and integration challenges. NIA funding enables controlled development and demonstration without exposing consumers to undue risk or cost.

The first two phases were delivered outside the NIA as they involved low-cost feasibility and early prototyping work that could be funded through business-as-usual budgets. At that stage, the concept was at too early a TRL to meet NIA requirements for a defined scope, learning plan and demonstrable network benefit. Phase 3, Lancet NIA, work supports an industry-wide move toward

standardisation, ensuring a consistent approach across all network operators and enabling the sector to progress in a more aligned and coordinated way.

This project has been approved by a senior member of staff

Yes