

NIA Project Registration and PEA Document

Date of Submission

May 2019

Project Reference Number

NIA_SPEN_0042

Project Registration

Project Title

Novel Temporary Earthing & Bonding Solutions

Project Reference Number

NIA_SPEN_0042

Project Licensee(s)

SP Energy Networks Distribution

Project Start

March 2020

Project Duration

0 years and 9 months

Nominated Project Contact(s)

Ralph Eyre-Walker

Project Budget

£40,000.00

Summary

This project will study and report on best practices for temporary earthing and bonding.

Third Party Collaborators

Energy Innovation Centre

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

There are two separate but similarly themed problems that are looking to be addressed in this project:

1. Portable earths consist of an arrangement of leads and clamps that can be heavy and cumbersome to handle and apply, particularly on overhead line networks and outdoor substation plants during windy conditions. The materials used are typically copper or aluminium, and are required to meet particular short circuit current ratings that are defined in ENA TS 43-81. To meet this standard, there are certain cross-sectional areas for the leads and clamping forces that must be adhered to. The combination of these factors results in the use of heavy and difficult to use apparatus, adding to these issues there is the need to use extended insulated fibreglass rods.

2. Network Operators use mobile generators to manage prolonged outages as part of repair and restoration this could lead to the breaking of guaranteed standards. As part of the use of these generators, a reference earth must be provided at the point of generation and this is often supplied by connecting to the system earth. There is a particular challenge that arises when substantial damage has been inflicted on the low voltage network resulting in the system earth being unavailable. In these cases, a temporary earth is created by driving earth rods into the ground until a suitable earth value is found. Often, due to location on the network and the

physical location of the generator, this is not practical.

Method(s)

A requirement of the project is to identify current earthing and bonding practices to establish existing levels of protection and security that can accommodate the standards set out by the Electricity Supply Industry. A detailed evaluation will encompass the need to either develop new techniques and methodologies for the UK DNO market or identify an overseas product/method that can be adopted into the current standards.

There is a constant need to improve efficiency, without lowering standards. The study may identify and target areas where inappropriate equipment and procedures have been adopted without sufficient background information. The study will provide a review of the adoption process, equipment selection and the associated regulations required.

Scope

There are two separate and parallel work streams (WS):

WS1 – Temporary earthing for overhead lines

WS2 – Temporary earthing for mobile generation

Both work streams will focus on the current working practices and equipment used by UK network operators. Further work will be carried out to understand best practice used in Europe, US and Australia.

Research will be carried out into current standards and if there are potential products available that can better meet these standards. Depending on how successful this research is, and the availability and cost of new products, trials and demonstrations will be carried out as part of the project.

Objective(s)

Stage 1 Objectives – Best practice and literature research

Capture current working practices with appropriate operational delivery (DNOs/contractors)
Review range and specification of existing equipment
Request information on equipment issues and potential improvements
Review compliance with latest EU standards
Identify equivalent standards and relevant test specifications used overseas

Stage 2 Objectives – Reporting

Advise on potential alternative products
Produce revised methodology and associated risk analysis
Close Out report

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be deemed a success if either:

- a) New technologies/methodologies are identified and adopted by UK DNOs
- b) If no new solutions are identified as this will re-assure the UK DNOs that current practices are adequate

Project Partners and External Funding

Transmission & Distribution Innovations Ltd (TDI Derby)
Energy Innovation Centre (EIC)

Potential for New Learning

Best practice across DNOs and EU

The report will capture details of best practice and shared learning in relation to equipment technology & methodology used outside the UK.

Scale of Project

Total project value is £40,000. NIA funding required is £40,000

Technology Readiness at Start

Technology Readiness at End

TRL7 Inactive Commissioning

TRL9 Operations

Geographical Area

Across all DNO license areas across GB

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

£40,000

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:

n/a

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)

This is a knowledge-gathering project. It is intended to identify best common practices that may lead to the improvement of specific applications which offer financial benefits to customers

Please provide a calculation of the expected benefits the Solution

N/A

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

All earthing systems used by the GB electricity industry are of the same type manufacturer or of the same technology. Therefore this is highly replicable across the country.

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

This will be determined through the project process.

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

All licensees will benefit from the best practices across the UK DNOS and EU. The networks will benefit from the adoption of identified market ready solution/s that improves on current methods.

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

- Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

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.

There has been no similar project seeking to investigate the following cases:

Are there portable earthing systems available that are easier to use whilst maintaining their adherence to the relevant standards?
Are there solutions that can be used in the field for mobile generation, where no system earths are available?

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

There has been no similar knowledge-gathering project seeking to identify current earthing and bonding practices to establish existing levels of protection and security.

Relevant Foreground IPR

n/a

Data Access Details

n/a

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

activities

N/A

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

N/A

This project has been approved by a senior member of staff

Yes