

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

Apr 2017

### Project Reference Number

NIA\_SPEN0020

## Project Registration

### Project Title

Instrument for the identification of Live and Not Live HV and LV cables

### Project Reference Number

NIA\_SPEN0020

### Project Licensee(s)

SP Energy Networks Distribution

### Project Start

May 2017

### Project Duration

3 years and 7 months

### Nominated Project Contact(s)

Andrew McDiarmid

### Project Budget

£250,000.00

## Summary

This project will have four main work packages:

### 1. Feasibility Study

A feasibility study will be carried out on a number of potential solutions to the problem, including magnetic coupling using differential hall sensors and inductive coupling, and the measurement of RF leakage levels. The results will be analysed and compiled into a feasibility report.

### 2. Instrument Design and Development

Using the feasibility study results, an instrument will be developed. A full instrument specification will be created, the PCBs and circuitry developed, along with the instrument's software, and the enclosure designed using CAD.

### 3. Acceptance and Field testing

The two prototype instruments will be tested in the field by trained operatives. The results of this testing- including accuracy of voltage detection, ease of use, and accuracy in determining whether a cable is live or dead. These results will be compiled into a report.

### 4. Commercial Development

The results of the testing phase will be used to inform further development of the instrument, taking the prototype to a commercially viable product.

### Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

## Problem Being Solved

Currently, the only true way of identifying whether a cable is live or not is to use a spiking gun. This can cause issues, particularly where the cable has been misidentified, or where a cable cannot be found on record or traced. This can result in live cables being spiked, which can be dangerous and cause serious damage.

A secondary issue for some areas is identifying whether a cable is running at HV or LV. This is a particular issue in many areas, where some HV cables are run at LV, and where HV Cables can closely resemble some LV cables. This is a clearly dangerous situation, and can result in an HV cable being opened live.

These issues have been prominent and caused difficulties in a number of licensee areas.. There is also a current panel of inquiry in the Manweb area concerning a live HV cable which was opened in error.

## Method(s)

The project will develop an instrument to determine whether a cable is live or not live, then if live, it will determine if the cable is running at HV or LV. This will be carried out by running a feasibility study on potential solutions, developing an instrument based on the results, and then producing prototype devices to test on the network.

## Scope

This project will have four main work packages:

### 1. Feasibility Study

A feasibility study will be carried out on a number of potential solutions to the problem, including magnetic coupling using differential hall sensors and inductive coupling, and the measurement of RF leakage levels. The results will be analysed and compiled into a feasibility report.

### 2. Instrument Design and Development

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The results of the testing phase will be used to inform further development of the instrument, taking the prototype to a commercially viable product.

## Objective(s)

The main objectives of this project regard the development of an instrument which will allow cables in a cable trench to be identified whether a cable is live, then identifying whether it is running at HV or LV. Two prototype units with specifications and CAD drawings will be delivered. The final result of the project will be a commercial product which may be produced by a manufacturer.

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

n/a

## Success Criteria

The delivery of the above objectives, within budget and within agreed timelines, as is reasonable depending on the knowledge at this stage of the development phase.

The project will be managed within SPEN applying due diligence and best practices where appropriate.

The staged outcomes will include reports and specifications available for other licensees.

## Project Partners and External Funding

## Potential for New Learning

This project will provide learning which will allow the results of device testing to be repeated.

## Scale of Project

The scale of the project is appropriate for this early-stage product research and development. The development of two test units will allow them to be tested in different sections of the network and provide data for further development.

## Technology Readiness at Start

TRL4 Bench Scale Research

## Technology Readiness at End

TRL7 Inactive Commissioning

## Geographical Area

The device will be tested within our Central and Fife and Merseyside districts. This covers a wide area, and also encompasses St Andrews, where there have been particular issues with legacy LV cables being run as HV, and issues with unidentified cables.

## Revenue Allowed for the RIIO Settlement

None

## Indicative Total NIA Project Expenditure

£120,000

## 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)

If a live cable is spiked in error, or an HV cable opened live in place of an LV cable, there can be significant interruption to customer's supplies. The cost associated with this is dependent on the number of customers on the affected section, but can be significant. Additionally, the spiking and opening of live HV cables poses a serious risk of fatalities and serious injuries, with a high social cost.

#### Please provide a calculation of the expected benefits the Solution

N/A – As outlined above, the savings are dependent on the area and the scale of the issues identified.

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

The project can be rolled out across all licensees, and it can be used widely – every DNO has to check the status of cables every day, so the device would be used commonly.

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

The rollout costs are not possible to determine at this stage as they are dependent on the final cost of the product per unit, and the number of units each licensee would buy.

### 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 trialed 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

## RIO-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 identification of Live HV and LV cables is a safety concern across all distribution licensees. This is a major safety concern, and providing a device which will assist in the avoidance of these unsafe incidents will be useful for all licensees.

### Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIO-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.

To the best of SPEN's knowledge, there are no similar devices on the market, and no development work on this type of device has been carried out.

There have been some devices that have similar applications, in that they look to ensure that the correct cables are worked on. However, these projects and products focus on the identification of specific cables – that is, they identify which cable in a trench is a specific one from a specific source. This differs from this project's device, as this device will identify whether a cable is safe to work on or not, rather than identify it and its source.

### 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

n/a

### 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