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NIA Project Registration and PEA Document

Date of Submission

Oct 2017

Project Reference Number

NIA_UKPN0029

Project Registration

Project Title

Assessment & Testing of Alternative Cut-outs

Project Reference Number

NIA_UKPN0029

Project Licensee(s)

UK Power Networks

Project Start

November 2017

Project Duration

1 year and 3 months

Nominated Project Contact(s)

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Project Budget

£765,080.00

Summary

The scope of the project is to identify alternative, more reliable cut out equipment used by non-GB DNOs (or novel arrangements and practices) and prove they are suitable for replacing the ones currently used by GB DNOs.

The main benefits expected from the project can be summarised below:**Safety benefits:** The project is looking to identify, test and approve a more reliable and robust cut-out assembly, compared to the ones currently used by GB DNOs. Learning from the project will also be used to inform standards and recommendations around the inspection requirements for cut-outs. Both aim to decrease the risk of disruptive cut-out failures and consequently any related safety risks.**Financial benefits:**

- Following the point above, there will be a reduced risk to damaging third party assets and property. Therefore, we expect that following the project fewer insurance claims will be made against GB DNOs.
- Avoiding disruptive cut out failure will also help reduce the amount spent on investigation fees following cut-out faults.
- By targeting the replacement of cut-outs (starting with the highest risk types), a decrease in the number of reactive cut-out replacement following the report of a defect or failure is anticipated. There will also be a financial benefit from having planned rather than unplanned replacements.

Network reliability: More robust and reliable cut-out assemblies on the network and more informed cut-out inspection regimes will mean less disruptive cut out failures. This will increase GB network's reliability and help avoid power cuts.

Nominated Contact Email Address(es)

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Problem Being Solved

Each Low Voltage (LV) customer is connected to the distribution network by fused cut-out equipment normally (but not always) located within the customer's property or in a meter box. This cut-out equipment belongs to the Distribution Network Operator (DNO) and

provides the interface between the DNO and the Meter Operator (MOP). The fuse fitted in the cut-out equipment provides a means of disconnecting the customer's wiring in the event of a fault occurring on the wiring within the property.

Both the DNO and MOP have the authority to connect/disconnect wiring to the cut-out equipment and seal this equipment to prevent unauthorised interference. Only the DNO has authority to replace a blown fuse.

Historically DNOs have not separately inspected cut-out equipment for defects themselves, but do currently have a number of different measures in place to effectively manage these assets, such as visits from meter operators to periodically replace meters.

Cut-out equipment in customers' premises can become damaged which could result in live conductors becoming exposed or cause current to leak to earth. These conditions are potential hazards to the occupants of the premises if left unresolved. It is also possible for cut-out equipment to overheat under certain conditions and this has been identified as a possible cause of fires in customers' premises. Similar reliability issues of cut-out equipment have been reported by DNOs in the past.

The UK Government is currently supporting the mass roll out of Smart Meters. These Smart Meters will have Automatic Meter Reading (AMR) functionality, which will enable the remote communication of meter readings to the supplier, negating the need for them to visit individual premises to obtain meter readings. This means the regular inspections by MOPs will no longer take place increasing the risk of a potential cut-out failure being detected.

Method(s)

This project will look at alternative cut-out equipment used by network operators outside the UK and assess the suitability of these as a potential replacement for existing equipment. This aims to negate the issues that have been highlighted by various DNOs and a number of external stakeholders. It will attempt to achieve this by comparing the new technologies against existing equipment used by GB DNOs under normal operating conditions, but also under any known failure modes.

The project will also consider potential novel arrangements of the currently used cut-out assemblies, as well as practices followed by utilities outside the UK with the aim of finding possible solutions to identified problems.

Scope

The scope of the project is to identify alternative, more reliable cut out equipment used by non-GB DNOs (or novel arrangements and practices) and prove they are suitable for replacing the ones currently used by GB DNOs.

The main benefits expected from the project can be summarised below:

Safety benefits: The project is looking to identify, test and approve a more reliable and robust cut-out assembly, compared to the ones currently used by GB DNOs. Learning from the project will also be used to inform standards and recommendations around the inspection requirements for cut-outs. Both aim to decrease the risk of disruptive cut-out failures and consequently any related safety risks.

Financial benefits:

- Following the point above, there will be a reduced risk to damaging third party assets and property. Therefore, we expect that following the project fewer insurance claims will be made against GB DNOs.
- Avoiding disruptive cut out failure will also help reduce the amount spent on investigation fees following cut-out faults.
- By targeting the replacement of cut-outs (starting with the highest risk types), a decrease in the number of reactive cut-out replacement following the report of a defect or failure is anticipated. There will also be a financial benefit from having planned rather than unplanned replacements.

Network reliability: More robust and reliable cut-out assemblies on the network and more informed cut-out inspection regimes will mean less disruptive cut out failures. This will increase GB network's reliability and help avoid power cuts.

Objective(s)

The objectives of the project can be summarised as follows:

- Identify alternative cut out equipment used outside of GB and prove that they are suitable for replacing in service cut-outs.
- Identify novel arrangements and practices from DNOs outside of GB and assess whether or not they can negate some of the known problems that existing cut-outs in GB have.
- Generate and disseminate enough learning to drive more informed inspection, maintenance and replacement cut-out regimes within each GB DNO.
- Generate and disseminate enough learning to influence the BS 7657 and the ENA engineering recommendation for inspecting cut-outs.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be successful if it manages to satisfy the following criteria:

- Identify alternative cut-outs (to the currently in-service cut-outs in the UK) to trial in the testing cells (following the desktop review and assessment)
- Prove whether the alternative cut outs identified are suitable for replacing current cut outs used by DNOs in GB
- If they are suitable-
 - o Provide evidence to enable BS 7657 and the ENA engineering recommendation for inspecting cut-outs to be revised based on final recommendations
 - o Facilitate more informed decisions on inspection, maintenance and replacement of cut-outs and influence relevant regimes within each DNO

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

Within the project, a total of up to 60 alternative cut-outs will be involved in the trial. This is to allow a sufficient number of each shortlisted type to be procured and tested. The final number will be decided once the desktop study is complete, and the testing regime is finalised.

An equal number (in total) of in service cut outs will be provided by the participating DNOs for testing alongside the alternative cut-outs. The in service cut-outs should cover ideally most of the different cut-out types that can be found on GB distribution networks.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This is a collaboration project amongst various GB DNOs and therefore covers most of GB.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

The total NIA project Expenditure is expected to be £790,080 from which £711,072 will be the total Allowable NIA Project Expenditure.

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)

The Gross Annual savings for full scale deployment across the license areas of one GB DNO (based on UK Power Networks' data) are roughly £5.5m.

This includes savings from:

- Planned replacement of cut-outs against unplanned
- A reduction in insurance claims and investigation costs where applicable
- A reduction in post-fault investigation costs

Please provide a calculation of the expected benefits the Solution

The expected financial benefits (excl. any safety and network reliability benefits) below are at a project scale and realised within the remainder RIIO-ED1 period. All costs and benefits are discounted.

Base Cost: £454,343.35

The baseline scenario assumes that a GB DNO proactively replaces roughly 0.1% of their older cut-outs with cut-out types found in GB. The DNO also reacts to cut-out failures with unplanned repairs, forensic investigations and insurance claim payments (if third party damages were caused by the cut-out failure).

Method Cost: £312,998.40

By targeting the replacement of older cut-outs (planned replacement), it has been assumed that 20% of cut-out failures are prevented. The remaining 80% of failed cut outs are replaced reactively (unplanned repairs and replacement). A 20% decrease in forensic investigation and third party claims costs has been taken into account.

Financial Benefits: (Based Cost – Method Cost) = £141,344.95

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

The learning generated through the project will be directly applicable to all GB distribution networks as all GB DNOs use fused cut-out equipment to connect customers on their networks. All GB DNOs face the same challenges relating to the in-service cut-outs and will benefit from the outputs of the project.

Alternative cut-out equipment identified and proven suitable for replacing currently used ones could be deployed on all GB distribution networks where cut-outs are installed.

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

The cost for replacing a cut-out in a planned way is roughly £350/cut-out. This includes the price for the cut-out (types currently used in GB) and the operational costs for the installation. This number may vary if the cost for the alternative cut-outs differs from the currently used ones.

There are roughly 29.5million customers connected on GB's distribution network through fused cut-outs. If we assume that GB DNOs replace 0.1% of their cut-outs per year proactively and in a planned (based on historic data on cut-out replacement), the annual cost of rolling out the solution would be $£350 \times 29.5m \times 0.1\% = £10.3m$. Over the remainder RIIO-ED1, the cost for rolling out the solution would be approximately £50m.

It should be noted that for post-fault cut-out replacements, the roll out of a new type of cut-out would be part of their standard replacement schemes and would not increase the budget allowed for the scheduled replacements.

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

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 DNOs own fused cut-out equipment which are used to connect customers on the distribution network. They all face the same challenges relating to this equipment and will benefit from identifying alternative, more reliable cut-outs that can replace in service ones.

With the Smart Meter rollout, one of the challenges that all DNOs will face is the increased failure risk from the lack of cut-out inspections (MOPs will not be attending customer premises to take meter readings and inspect cut-outs). Learning from the project will provide evidence to enable the revision of BS 7657 and the ENA engineering recommendation for inspecting cut-outs and help inform DNO decisions on Inspection, Maintenance and Replacement of Cut-outs.

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.

n/a

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