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NIA Project Registration and PEA Document

Date of Submission

Sep 2015

Project Reference Number

NIA_SSEPD_0014

Project Registration

Project Title

Underground Cable Overlay Cost Reduction

Project Reference Number

NIA_SSEPD_0014

Project Licensee(s)

Scottish and Southern Electricity Networks Distribution

Project Start

September 2015

Project Duration

1 year and 6 months

Nominated Project Contact(s)

SSEN Future Networks Team

Project Budget

£540,000.00

Summary

The project aims to investigate whether the two identified cable overlay methods could reduce the cost and disturbance caused to the customers due to the cable overlay activity. The scope of the project includes:

- Undertake a 'horizon scanning' exercise aiming to identify and gather information on cable overlay methodologies/ technologies, the environmental factors and circumstances where they could effectively be applied.
- Agree commercial terms and conditions with involved suppliers.
- Gather requirements and select candidate sites for testing the methodologies from two suppliers.
- Submitting a customer engagement plan and data privacy strategy governing potential interactions with customers about wayleaves or easements required in order to utilise their land, potential interaction with customers affected from the street works, interactions with customers in order to undertake the focus group(s) planned as part of the project.
- Undertake surveys in the selected sites in order to baseline costs of traditional open-cut trench methods and innovative methods.
- Implement project trials in two stages, with a decision point after trial 1 on whether to proceed to next stage or not. The decision will depend on the performance of the methodologies (assessed individually) up to this point and the confidence of coping with the second trial stage.
- Trial Stage 1: The identified overlay methods will be applied in an environment without many complexities (i.e. limited number of nearby underground assets). The selected circuits will be of 33kV, 11kV in each case, and the newly installed cable will be of greater cross section compared to the previous one. The length of the cable that will be overlaid will be between 50 – 100m, depending on the availability of a suitable circuit.
- Trial Stage 2: The identified extraction methods will be applied in an environment with increased complexity, (i.e. greater number of nearby underground assets). The characteristics of the methods will be similar to these of stage 1.
- Analysis in order to identify whether there are financial benefits from the tested cable overlay methods and evaluation of the applicability of the tested cable overlay methods.
- Focus group(s) will be undertaken with a range of stakeholders in order to obtain qualitative information on the disturbance caused

by the tested cable overlay methods.

- If the identified cable overlay methods prove to be beneficial, a decision will be taken whether to transition to 'business as usual' operation. If the decision is positive, the appropriate arrangements will be made including the training of identified SSEPD departments and the lessons learned will be reported within the close out report.

Nominated Contact Email Address(es)

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Problem Being Solved

Underground cable overlay is the activity through which a certain part of the underground network is replaced or reinforced. The traditional methods of cable overlay commonly involve open-cut trenches where the initial cable is decommissioned and the new cable is laid. Once the laying of the new cable is completed, a switch of connection between the former and the latter cable is performed and commonly the decommissioned/ redundant cable remains in the ground. The current method involves open cut trenches which is a costly operation and causes disturbance to the public and businesses due to site activities.

Method(s)

Companies have developed innovative cable overlay processes which extract a previously installed cable and install a new cable at its position without having to open cut a trench along the entire route of the initial cable. They aim to reduce the cable overlay cost to the DNOs and therefore the customers by reducing the excavation and reinstatement cost and retrieving value from the extracted cable (copper or aluminum). In addition, they aim to reduce the disturbance created from traditional cable overlay methods by reducing the length of open-cut trenches required in order to complete the cable overlay.

Two suppliers have been identified as being able to offer innovative cable overlay methods and both of them have utilised the cable extraction part of the cable overlay method at higher voltages within the UK. This project is going to investigate whether this technique for cable overlay can be applied at lower voltages (33kV, 11kV) in order to accommodate the needs of SSEPD and other network operators. These voltage levels have been selected upon the current belief that these methods need to be trialed at lower voltages prior to testing them at 66kV or 132kV where the risk to supplies is greater.

LV is excluded from the project scope as the LV network present additional challenges to the proposed methodologies (i.e. frequent presence of joints, customers' supplies, etc.). If the methodologies prove to be working effectively in the scoped voltage levels (11kV, 33kV), further work on the LV level may be proposed.

Scope

The project aims to investigate whether the two identified cable overlay methods could reduce the cost and disturbance caused to the customers due to the cable overlay activity. The scope of the project includes:

- Undertake a 'horizon scanning' exercise aiming to identify and gather information on cable overlay methodologies/ technologies, the environmental factors and circumstances where they could effectively be applied
- Agree commercial terms and conditions with involved suppliers
- Gather requirements and select candidate sites for testing the methodologies from two suppliers
- Submitting a customer engagement plan and data privacy strategy governing potential interactions with customers about wayleaves or easements required in order to utilise their land, potential interaction with customers affected from the street works, interactions with customers in order to undertake the focus group(s) planned as part of the project.
- Undertake surveys in the selected sites in order to baseline costs of traditional open-cut trench methods and innovative methods.
- Implement project trials in two stages, with a decision point after trial 1 on whether to proceed to next stage or not. The decision will depend on the performance of the methodologies (assessed individually) up to this point and the confidence of coping with the second trial stage.
- Trial Stage 1: The identified overlay methods will be applied in an environment without many complexities (i.e. limited number of nearby underground assets). The selected circuits will be of 33kV, 11kV in each case, and the newly installed cable will be of greater cross section compared to the previous one. The length of the cable that will be overlaid will be between 50 – 100m, depending on the availability of a suitable circuit.
- Trial Stage 2: The identified extraction methods will be applied in an environment with increased complexity, (i.e. greater number of nearby underground assets). The characteristics of the methods will be similar to these of stage 1.
- Analysis in order to identify whether there are financial benefits from the tested cable overlay methods and evaluation of the applicability of the tested cable overlay methods.

- Focus group(s) will be undertaken with a range of stakeholders in order to obtain qualitative information on the disturbance caused by the tested cable overlay methods.
- If the identified cable overlay methods prove to be beneficial, a decision will be taken whether to transition to 'business as usual' operation. If the decision is positive, the appropriate arrangements will be made including the training of identified SSEPD departments and the lessons learned will be reported within the close out report.

Objective(s)

- The project will determine if the identified innovative cable overlay methods can reduce the current cost of cable overlay (quantitative information).
- The project will determine if the identified innovative cable overlay methods can reduce the disturbance to stakeholders through qualitative information collected from focus groups.
- The project will determine if the identified innovative cable overlay methods can reduce the environmental impact of the cable overlay process (qualitative and/ or quantitative)

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be considered a success if it can determine the effectiveness (positive or negative) of the innovative cable overlay methods in comparison to the traditional open-cut trench approach.

The effectiveness will be measured through variation of the unit cost of cable overlay (quantitative information), variation of the disturbance caused due to the innovative cable overlay method (qualitative information) and variation in the environmental impact of the cable overlay process (qualitative and/ or quantitative information).

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project is going to trial the 2 methods (from the 2 suppliers) in the following cases:

- Trial Stage 1: 4 circuits (33kV, 11kV), 2 circuits per supplier, 50 - 100m each circuit
- Trial Stage 2: 4 circuits (33kV, 11kV), 2 circuits per supplier, 50 - 100m each circuit

- The circuits that will be selected will not be connected to a live network, in order not to impact the supplies to customers.
- Different voltage levels are included due to the fact that the equipment of the suppliers need to be altered in order to cope with different cable cross sections which correspond to different voltage level.
- Trial stage 2 aims to increase complexity of the environment where the cable overlay methods are tested. Trial stage 1 will involve testing the methods in a simpler environment in order to demonstrate whether the methods can cope with the selected voltages and trial stage 2 will assemble an operational environment.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The project will be focused in SEPD (south central England). In case that no suitable, available (redundant, not connected to a live network) circuits could be identified in the SEPD license area; the project will investigate the SHEPD license area for available circuits.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

Total NIA expenditure will be £540,000 of which 90% (£486,000) is Allowable NIA 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 anticipated saving is expected to be in the order of 10 to 20%.

Please provide a calculation of the expected benefits the Solution

Not required for Research Project.

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

The tested cable overlay methods could be applied to cases where underground cable replacement or reinforcement at 11kV and 33kV voltage levels is needed. The method could be applicable to places where underground cables exist.

The project aims to test whether these methods offer benefits (cost, disturbance and environmental as outlined earlier) in order to be considered as alternative to traditional open cut trench method. The methods could be applied at the aforementioned voltages, within underground asset across the portfolio of DNOs within the UK.

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

The project intends to provide lessons learned on the effectiveness of the tested cable overlay methods regarding cost, disturbance and environmental aspects as described previously. If the cable overlay methods are successful and the decision is to proceed to transition to business as usual and undertake training of the SSEPD personnel, it will report the details of the training schedule. The lessons learned as reported by the project could be utilised by other network operators in order to determine the applicability of the methods to their networks and determine the cost for rolling out the methods as business as usual.

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 learning that will be generated will be available to other DNOs in order for them to assess whether or not the tested methods would be suitable for their own underground cable network.

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