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NIA Project Registration and PEA Document

Date of Submission

Oct 2016

Project Reference Number

NIA_NGET0198

Project Registration

Project Title

Cost effective removal of conductor crossing clearance constraints

Project Reference Number

NIA_NGET0198

Project Licensee(s)

National Grid Electricity Transmission

Project Start

November 2016

Project Duration

1 year and 9 months

Nominated Project Contact(s)

Karl Head

Project Budget

£268,000.00

Summary

The scope of this project is to develop the installation methodology for raising the height of the bottom phase conductor on a tower by installing semi tension insulators on two consecutive towers in order to reach an overall increase in overhang clearance by 5m.

This methodology will then be tested by raising the overall height by 5m of two consecutive towers over a river crossing.

Nominated Contact Email Address(es)

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Problem Being Solved

Overhead line (OHL) Conductors can place restrictions on major river crossings due to clearance distances between the overhanging line and the large vessels. This can restrict industry and shipping movements into these ports. To remove these restrictions through traditional methods you would either have to remove the conductors for a period of time or increase the tower heights at the crossing. Both options can be costly and can lead to system constraints.

An innovative and quick solution which has been proposed to enable height restrictions to be increased without causing significant systems constraints is to change the position and angle of the insulator (a piece of equipment that prevents conduction of electricity between the line and the tower) to enable the height of the conductor to be increased, without the need to modify the tower itself.

Method(s)

This project aims to test the ability to change the position and angle of the insulator without the need to alter the height of the existing tower, remove conductors temporarily or to underground the cable, two semi tension insulator sets could be fitted to the bottom phase conductor on the towers either side of the crossing.

This will be the first time semi tension insulators have been fitted on two consecutive towers of this height within the GB transmission system.

Scope

The scope of this project is to develop the installation methodology for raising the height of the bottom phase conductor on a tower by installing semi tension insulators on two consecutive towers in order to reach an overall increase in overhang clearance by 5m.

This methodology will then be tested by raising the overall height by 5m of two consecutive towers over a river crossing.

Objective(s)

The objective of this project is to trial the ability to raise the overall height by 5m by installing semi tension insulators on two consecutive towers.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be deemed successful if the overall height of two consecutive in situ towers can be raised by 5m by installing semi tension insulators.

Project Partners and External Funding

External Funding – (nil)

Potential for New Learning

The project will identify whether it is possible to raise the height of a conductor by up to 5m using semi tension conductor sets on two consecutive towers. The project will also identify any potential technical challenges and offer solutions for using this as a method or increase conductor clearances.

Scale of Project

The scale of the project is to develop a methodology for installation of the semi tension conductor set to raise the height of a conductor and then implement this over a river crossing on the Network.

The initial development work is required to identify and potential technical challenges and to establish the best working methodology.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Northern England

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

Total Project Expenditure is £268,000

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)

The two alternatives to using this solution for increasing conductor height would either be to remove the conductors for a period of time, to allow a the height restricted vessel to pass through or to modify the tower to increased its height.

Increasing the tower height by the use of this innovated solution would have a number of potential benefits over the other solutions. It is a more cost effective solution, it is up to £1.1 million cheaper than removing conductors or increasing tower heights. It would be much less disruptive to the local community and offer a significant carbon saving over increasing the height of the towers as, large amounts of steel work would not be required.

Please provide a calculation of the expected benefits the Solution

For one application the cost saving would be £1.1 million, the saving would be more if we were not able to remove the conductors for a period of time. The cost of rasing the tower height would be £2.5 million.

(Removal of conductors = 1.3 million) – (Demonstration Cost = 175k) + (development cost = 70k) = (Cost Saving = 1.05Million)

(Increasing tower height = 2.5 million) – ((Demonstration Cost = 175k) + (development cost = 70k) = (Cost Saving =£ 2.25 million)

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

There are four navigatable rivers with powerlines crossing them on the National Grid Transmission Network where this technology could be applied. There is also a further crossing on the Forth River in Scotland. It is proposed that this solution would be used on a case by case basis to resolve conductor height issues. There could also be further application of this solution on road crossings if height restriction issues arised.

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

This solution would be rolled out on a case by case basis but each application has the potential to save between £1-2.2 million.

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 from this project could be applied to other sites where additional clearance of a conductor is required. A presentation will also be held at the trial site following the successful trial in order to disseminate learning to a wider audience

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

Managing Assets

- 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.

We have performed a literature review and engaged with other UK Transmission utilities. This solution has not been trailed anywhere on two consecutive towers on the GB transmission system.

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