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

Feb 2016

Project Reference Number

NIA_NGET0181

Project Registration

Project Title

Classification of Wind Exposed Overhead line Spans

Project Reference Number

NIA_NGET0181

Project Licensee(s)

National Grid Electricity Transmission

Project Start

February 2016

Project Duration

1 year and 3 months

Nominated Project Contact(s)

Mike Fairhurst

Project Budget

£250,000.00

Summary

Innovation comes from the application of this method and is aimed at providing a more accurate and confident identification of risk of overhead line deterioriation.

Specific deliverables required of this project are:

1. Test the relationship between span environment and the repair/defect history. Establish confidence level in the method by applying it to a number of OHL routes.
2. Classify wind exposure types.
3. Re-classify environments for each tower/span and show the impact on asset life calculations.

Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

Problem Being Solved

A key parameter affecting the deterioration of ACSR Zebra overhead lines is their location, mainly in terms of environmental conditions, which lead to vibration. At present, the environment is classified into three categories, high medium and low risk. This classification is chosen based on altitude and proximity to coastal areas.

This project aims to review this categorization and attempt to develop a more refined methodology to determine the degradation rate of overhead lines based on their physical location.

Method(s)

The overhead line environment will be modelled to understand the impact. Four characteristics in particular will be analysed:

1. Wind Speed – Higher than average for the section
2. Wind Direction – Spans perpendicular to prevailing wind
3. Turbulence Intensity – Low
4. Wind Shear – Low

The technical method proposed in this project models characteristics such as; turbulence, wind direction and extreme wind and ice loading events, to provide a more accurate assessment of the likelihood of conditions giving rise to conductor motion.

Scope

Innovation comes from the application of this method and is aimed at providing a more accurate and confident identification of risk of overhead line deterioriation.

Specific deliverables required of this project are:

1. Test the relationship between span environment and the repair/defect history. Establish confidence level in the method by applying it to a number of OHL routes.
2. Classify wind exposure types.
3. Re-classify environments for each tower/span and show the impact on asset life calculations.

Objective(s)

To better understand how wind forces affect our OHL system and the overall risk to our asset portfolio of short term and longer term damage.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The outputs of this research project will provide the industry:

1. Confidence level in the technique is established.
2. Impact of environment re-classification is demonstrated.
3. Potential for new environment categorizations is discussed with recommendations.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project will consider sections of England and Wales when developing the models.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

This work is primarily desk based.

Revenue Allowed for the RIIO Settlement

A little under £300m of full overheadline replacement work (conductor, fittings and tower steel work) is included in the NGET RIIO T1 plan. The degree to which savings against this can be made as a result of this project is not yet clear as the project output is likely to be highly location specific. Efficient replacement priority is also influenced by factors outside of the scope of this project - such as corrosion and outage availability.

Indicative Total NIA Project Expenditure

Indicative NGET NIA expenditure is £250,000

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 ability to look at ways to mitigate the likelihood and severity of wind induced motion to extend the anticipated life of existing conductor systems and reduce the likelihood of failure.
- Potential to target replacement of sections where the new method provides confidence in the wind exposure risk levels.
- Potential to explore change in damping design to extend life of wind exposed conductors

If successful on all the above, we believe we could save around £180.00 per km of overhead conductor.

Please provide a calculation of the expected benefits the Solution

Not required for research projects

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

Replicable across Transmission OHL systems in the whole of the UK.

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

Over £3m across the whole of the GB Transmission system.

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

To determine the potential benefit of employing this method on their own system.

The relevant Network Licenses will see the performance of the application in identifying areas at risk.

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