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NIA Project Registration and PEA Document

Date of Submission

Jan 2014

Project Reference Number

NIA_NGET0137

Project Registration

Project Title

Noise Assessment of ACCR Conductor

Project Reference Number

NIA_NGET0137

Project Licensee(s)

National Grid Electricity Transmission

Project Start

February 2014

Project Duration

2 years and 10 months

Nominated Project Contact(s)

Mike Fairhurst

Project Budget

£981,000.00

Summary

The scope of the project covers the replacement of 3 spans of a particular conductor, with a new type of low noise conductor. The project will then collect and analyse data and perform comparisons between the two conductors. If there is a positive outcome of the project, it will provide support to future re-conductoring projects by being able to provide assurance during planning permission stages, that the upgrading from 275kV to 400kV will not materially affect the local environment. Noise issues are a criteria of this planning process.

Nominated Contact Email Address(es)

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Problem Being Solved

National Grid use a specific type of conductor on Over Head Line routes in order to increase capacity on existing lines, and avoid building new towers. Due to the conductor construction, it is known to create a nuisance noise that is becoming an issue to people living near the line.

National Grid have an opportunity to exploit some research previously conducted in other projects - NIA_NGET0067 and the IFI project "Acoustic Emissions". These two projects found that the ACCR conductor is a high performance conductor (in terms of capacity) and produces a relatively low noise. This project aims to validate the research, but in an operational environment.

Method(s)

Demonstration

- National Grid are building on research conducted in the laboratory at the University of Manchester. In the lab, this conductor demonstrated decreased acoustic emissions in the controlled environment.
- The project will string a short section (3 spans) of ACCR conductor into both circuits in an existing route, where there are existing noise issues.

- National Grid will then monitor the conductor in various weather conditions for 12 months, specifically targeting acoustic emissions. This cannot be done on the same route as used in NIA_NGET0067, as one side of the tower uses a CTC conductor, and the other is ACCR. This route would not be suitable for capturing the data regarding acoustic emissions.
- Produce a direct comparison report between the new conductor, and the existing conductor.
- Identify a full route for deployment

Scope

The scope of the project covers the replacement of 3 spans of a particular conductor, with a new type of low noise conductor. The project will then collect and analyse data and perform comparisons between the two conductors. If there is a positive outcome of the project, it will provide support to future re-conductoring projects by being able to provide assurance during planning permission stages, that the uprating from 275kV to 400kV will not materially affect the local environment. Noise issues are a criteria of this planning process.

Objective(s)

The objective of the project is to trial a conductor that can provide high capacity and low noise on the Over Head Line Transmission network.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

- Stringing of the conductor
- Data Collection for 1 year
- Data interpretation and comparison to existing conductor
- Business Implementation documents

Project Partners and External Funding

The project is being supplied by 3M and Bruel & Kjaer.

There is no external funding being brought to this project. The project is being co-ordinated by National Grid.

Potential for New Learning

This project will generate new learning with regard to the acoustic emissions generated from this particular type of ACCR conductor. This knowledge will be shared with other network licensees through- ENA Smart Portal, NationalGrid.com website, and other mechanisms including conferences, and best practice fora.

Scale of Project

This project is being demonstrated on 3 spans of a particular route. We cannot reduce the scope further and provide the same benefits to customers because this work is the convergence of multiple innovation projects. This is the final step in being able to use this conductor on the Network in a live environment. Laboratory work has already been carried out at the University of Manchester HV testing facility. This work is necessary for National Grid to complete in order to be able to deploy ACCR with confidence, as a low noise conductor.

The lab tests originally carried out tested noise on 3 single conductors in isolation - CTC, ACCR and GAP. This project will deploy ACCR, in a Twin Bundle configuration at 400kV on 2 circuits, for 3 spans. This aims to validate the results found in the lab.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

This project will be demonstrated in Cheshire.

Revenue Allowed for the RIIO Settlement

Zero

Indicative Total NIA Project Expenditure

£981,000

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)

ACCR conductors can double the capacity of existing OHL routes without rebuilding towers. A typical circuit length is 50km, and allowances for building a new 400kV double circuit route with OHL is £2.2m/km. Therefore a cost of £110m would be incurred. To reconductor using this product would be in the region of £12m, therefore offering a potential saving of c.£98m.

Please provide a calculation of the expected benefits the Solution

Base = £110m for a 50km length

Method = £12m for a 50km length

B-M = £98m

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

This work can be applied to all of the National Grid OHL network.

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

An approximation to roll this out onto the National Grid network is £240,000 per circuit km - i.e £80,000 per phase km.

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

n/a

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

This project addresses the following areas of the innovation strategy:

Environment : The environment and reducing emissions

Environment : Enhanced Capacity

- 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.

Following a review of the ENA Smart Portal, and the standard supply base (including Universities and EPRI), National Grid confirm that this work has not been done before. This project is similar to the National Grid project NIA_NGET0067 - Trial and Performance Assessment of ACCR Conductor (3M). As can be seen from the progress update on that project, NGET0067 provided some unexpected benefits. This project is specific to investigating those benefits, and is sufficiently different to NGET0067 to be allowable for funding under the Network Innovation Allowance. The NGET IFI project 'Acoustic Emissions from HV Overhead Conductors' is also similar to this. The IFI project was lab focussed, whereas this is field deployment. The two are significantly different, and this NIA project will give National Grid the confidence to be able to use this technology in operational situations.

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