

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

May 2015

### Project Reference Number

NIA\_NGET0164

## Project Registration

### Project Title

Evaluation of a Novel Variant of ACCC HTLS Conductor

### Project Reference Number

NIA\_NGET0164

### Project Licensee(s)

National Grid Electricity Transmission

### Project Start

May 2015

### Project Duration

1 year and 1 month

### Nominated Project Contact(s)

Mike Fairhurst

### Project Budget

£500,000.00

## Summary

This project will monitor and evaluate the mechanical operational performance of the new alloy conductor to assess its practical application and installation on the Great Britain Electricity Transmission Network. In doing so, installation techniques will be developed. This will be achieved through a trial installation of this variant of HTLS conductor. Testing and evaluation of the electrical performance of the conductor is outside the scope of this project.

### Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

## Problem Being Solved

The resources required to build new Transmission lines, in addition to the time and effort required to obtain new rights of way, make the construction of new power lines costly. One method to improve the provision of contingencies at a reduced cost is to develop conductors with improved current carrying capacity, lower line loss, lower sag tension whilst maintaining its reliability and ease of installation. One technology that has come to the market consists in a new alloy with lower resistivity values allowing for the doubling of the capacity on an existing route as well as potentially reducing losses.

This technology has been trialled in France, but on a smaller conductor system that has a different configuration that isn't compatible with the Great Britain Electricity Transmission Network. Specific installation techniques therefore need to be developed and tested, and the conductor's mechanical operation and performance needs to be evaluated under controlled conditions in an environment that will not impact network performance or safety.

## Method(s)

1. Purchase the conductor and fittings for a trial installation at the National Grid Eaking test facility.
2. Develop installation techniques and monitor mechanical performance.

3. Provide installation experience within a controlled environment.
4. Evaluate the practical application and installation of the conductor on the GB Transmission Network.
5. Produce a final report.

## Scope

This project will monitor and evaluate the mechanical operational performance of the new alloy conductor to assess its practical application and installation on the Great Britain Electricity Transmission Network. In doing so, installation techniques will be developed. This will be achieved through a trial installation of this variant of HTLS conductor. Testing and evaluation of the electrical performance of the conductor is outside the scope of this project.

## Objective(s)

The objective of this project is to develop the necessary confidence in the installation and operation of a conductor technology untried in the UK, in order to enable its installation on the Transmission Network. If successful, the trial will diversify the range of HTLS conductor technologies available in the market and increase competition by providing an option that considers HTLS conductor cost, reliability, noise and Transmission loss factors.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

1. Full evaluation of the mechanical operational performance of the conductor.
2. Successful development of an installation methodology for the novel alloy technology that allows for future type registration and installation on the Great Britain Electricity Transmission Network.

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

## Scale of Project

This project will be delivered at the National Grid Eakring test facility. As a result, National Grid cannot reduce the scope of this project further and still provide consumer benefit.

## Technology Readiness at Start

TRL6 Large Scale

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

The de-energised test is being installed at Eakring, Nottinghamshire.

## Revenue Allowed for the RIIO Settlement

None

## Indicative Total NIA Project Expenditure

The indicative NGET NIA costs for the current scope of this project are £500,000.

## 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)

If the problem is solved and this new technology can be implemented into Business As Usual, savings will be achieved through reduced losses and increased capacity through existing lines without the need of further reinvestment into new ones. Savings can hence mount to over several tens of millions though it is difficult to quantify exactly.

#### Please provide a calculation of the expected benefits the Solution

A suitable but expensive variant of HTLS conductor was installed on a recent scheme on the NG transmission network. Savings of approximately £5m could have been achieved if the HTLS variant to be trialled had been available at the time of development for this scheme.

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

This methodology could be applied to every GB Transmission overhead line, in particular those requiring up-rating on existing L2 towers would be most suited to this technology.

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

This would be in the region of £8.5m per 10km installed but will vary depending on the scheme.

### 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

Other network licenses will be looking at deployment of new conductor technologies similar to and including the one tested as part of this work to offset the need to construct new transmission or distribution routes. This work will provide them with the installation and operational knowledge required to implement these into business as usual and consider them as part of their tendering process.

#### 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