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

Nov 2013

Project Reference Number

NIA_SHET_0006

Project Registration

Project Title

Insulated Cross Arms – Lecht & St Fergus Trials

Project Reference Number

NIA_SHET_0006

Project Licensee(s)

Scottish and Southern Electricity Networks Transmission

Project Start

January 2010

Project Duration

5 years and 1 month

Nominated Project Contact(s)

SSEN Future Networks Team

Project Budget

£489,000.00

Summary

The scope of this project is to design and build prototype Insulated Cross Arms, and conduct mechanical and electrical trials.

Nominated Contact Email Address(es)

transmissioninnovation@sse.com

Problem Being Solved

Currently the only method open to Transmission Network Owners (TOs) who wish to uprate their 132kV lines to 275kV is to rebuild the towers to a higher specification (i.e. larger towers), at a significant cost, due to the increased clearances from ground required by law for higher voltage lines.

Insulated Cross Arms (ICAs) will enable the uprating without the need to rebuild the towers (by effectively raising the height of conductors from the ground). This would allow greater throughput of power on the existing network with less expense on upgrades and quicker time frames for increasing network capacity.

The aim of the Insulated Cross Arms is to maximise the capacity of existing infrastructure without rebuilding tower lines.

Method(s)

Design and trial of Insulated Cross Arm technology that will allow the voltage uprating of 132kV tower lines to 275kV:

- The Lecht Trial (Scotland) will test the mechanical strength of 4 Insulated Cross Arms, the location was selected as one of our most exposed transmission lines; and
- The St Fergus Trial (Scotland) will test the electrical integrity of 2 of the Insulated Cross Arms to investigate how the arms handle polluted environments, As salt is the primary pollutant in this instance, the location was selected as a coastal location.

Scope

The scope of this project is to design and build prototype Insulated Cross Arms, and conduct mechanical and electrical trials.

Objective(s)

Design and build prototypes for the uprating of 132KV tower lines

Install protoype 132KV models in a harsh weather environment test area - The Lecht

Install current L3 prototype models in a coastal trial site to evaluate the effects of salt and other pollutants on the insulation – St Fergus

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Installing and monitoring the Lecht and St Fergus trials for the Insulated Cross Arms

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The scale of the Project is considered appropriate to the scale of the potential benefits. If the technology is successful, the financial and environmental benefits resulting from not rebuilding tower lines could be significant.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

This project will be undertaken at the Lecht and St Fergus within the SHE Transmission Licence area.

Revenue Allowed for the RIIO Settlement

We currently envisage using this technology as an alternative to new-build towers for some of our Strategic Wider Works projects. These projects are subject to Ofgem review and assessment on a case by case basis and therefore no funding is allowed as part of the RIIO-T1 settlement. We will provide further information as part of our project submissions.

Indicative Total NIA Project Expenditure

For 2013-14 the project plans to be funded through SHE Transmission's NIA allowance.

£15k has been budgeted for this period (of which 90% is allowable NIA spend).

Note: The Lecht trial has been completed and decommissioned, the St Fergus trial has been installed and is still running.

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)

By uprating a transmission tower without the need to rebuild, there is a potential significant cost saving. Construction of a new tower line involves substantial civil works to construct and de-construct temporary access roads and tower foundations.

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

Increasing network capacity is a challenge faced by all Network Licensees. If this method has a successful outcome leading to the eventual commercial availability of Insulated Cross Arms, it will be an option available to all 132kV to 275kV transmission reinforcement projects in GB.

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

The development cost of each Insulated Cross Arm is £25k, and this would be expected to reduce significantly with mass production, to make the method a cost effective alternative to rebuilding towers to uprate a transmission line from 132 to 275kV.

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

☐ 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

Learning from this trial is expected to ultimately lead to the Insulated Cross Arms being commercially available to Network Licensees.

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

The project will support the Innovation Strategy Objective of Maximizing the use of existing assets to deliver 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.

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