

NIA Project Registration and PEA Document

Date of Submission

Mar 2018

Project Reference Number

NIA_SSEN_0033

Project Registration

Project Title

ACSS Conductor Study

Project Reference Number

NIA_SSEN_0033

Project Licensee(s)

Scottish and Southern Electricity Networks Distribution

Project Start

March 2018

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Tim Sammon

Project Budget

£53,000.00

Summary

Overhead line conductors both in England and Scotland are predominately Aluminium Conductor Steel Reinforced (ACSR). Many of these will require replacement in the RII0-ED2 price control period. Many of these replacement schemes require increased current carrying ability. Presently to achieve the increase in current High Temperature Low Sag (HTLS) conductors are being utilised. Composite cored HTLS conductors have been trialled and, while effective, have exhibited higher installation risks than those associated with steel core conductors.

Horizon scanning activity has revealed another potential HTLS solution which utilises Aluminium Conductor Steel Supported (ACSS) conductor technology. This may offer a different cost performance option and may offer lower installation risk than the composite core conductor solution.

Third Party Collaborators

Energyline Ltd

Southwire

Nominated Contact Email Address(es)

Problem Being Solved

Overhead line conductors both in England and Scotland are predominately Aluminium Conductor Steel Reinforced (ACSR). Many of these will require replacement in the RIIO-ED2 price control period. Many of these replacement schemes require increased current carrying ability. Presently to achieve the increase in current High Temperature Low Sag (HTLS) conductors are being utilised. Composite cored HTLS conductors have been trialled and, while effective, have exhibited higher installation risks than those associated with steel core conductors.

Horizon scanning activity has revealed another potential HTLS solution which utilises Aluminium Conductor Steel Supported (ACSS) conductor technology. This may offer a different cost performance option and may offer lower installation risk than the composite core conductor solution.

Method(s)

Technology Review Carry out a technology review which would examine SSEN's preferred conductor type and size and also research equivalent and similar (ACSS) conductors from alternative suppliers. The review will include analysis of the mischmetal based corrosion protection available on some ACSS conductors.

Comparative Studies Previous conductor studies will be used as a basis for the comparative assessments. Each comparative study will assess the electrical performance (in span clearance and rating), mechanical performance of the conductor system and the structural response. Existing PLS CADD and Tower models will be used and a representative model will be prepared for each route.

Three scenarios will be studied;

- Single circuit 132kV wood pole , new build
- Double circuit 132kV lattice steel reutilisation
- Double circuit 272kV lattice steel reutilisation

Scope

Technology review of the conductor systems which would incorporate the ACSS type conductor.

- Comparative study against the following pre-existing studies undertaken by Energyline:
 - o Single circuit 132kV wood pole , new build
 - o Double circuit 132kV lattice steel reutilisation
 - o Double circuit 275kV lattice steel reutilisation
- Report on the above activities.

Objective(s)

Quantify any benefits available from ACSS.

Compare

ACSS H285 to other conductor options in the modelled scenarios.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Quantification of any benefits available from ACSS.

Comparison of ACSS to other conductor options in the modelled scenarios.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project will conduct an initial conductor study to establish the potential benefits of using ACSS conductor systems.

Technology Readiness at Start

TRL6 Large Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The conductor study will model 3 scenarios using a wood pole, a 132kV lattice steel, and a 275kV lattice steel overhead lines. These

represent widely used overhead line constructions on the GB network.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£53,000

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)

This is a research project which will enable estimation of any benefits available from the use of ACSS H285.

Please provide a calculation of the expected benefits the Solution

This is a research project which will enable calculation of any benefits available from a demonstration project the use of ACSS.

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

This is a research project which will enable estimation of how replicable any benefits available from the use of ACSS are.

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

This is a research project which will enable estimation of any benefits available from the use of ACSS H285.

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

Knowledge acquired from the conductor study will be made available for dissemination among network owners.

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