

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

Mar 2013

Project Reference Number

Project Registration

Project Title

Trial & Performance Assessment of ACCR Conductor (3M)

Project Reference Number

Project Licensee(s)

National Grid Electricity Transmission

Project Start

September 2011

Project Duration

1 year and 1 month

Nominated Project Contact(s)

National Grid TO Innovation Team

Project Budget

£385,000.00

Summary

There are varied types of power flow limitation in modern power systems. If the problem can be solved by a relatively large increase in the thermal rating of an overhead line, re-conductoring the line with High Temperature Low Sag (HTLS) conductor is a possible solution. These conductors are capable of high temperature operation with minimal change in electrical and mechanical properties and have low sag at high temperature when compared to conventional conductors.

In order to increase a lines thermal rating without rebuilding or replacing its structures and foundations, the original conductor can be replaced with a special HTLS conductor having the a similar dimensions and properties as the original, but which can be operated safely and reliably at much higher temperatures with far greater ampacity.

The 3M Company was established in 1902 with \$27 Billion Sales in 2010 over 80,000 employee's world wide.

ACCR conductor has over 10 years service history with no reported failures in service and no failures during installation. To date there are 90 successful installations, in over 60 different countries, with more scheduled for 2011, 2012 & 2013. With the most recent installation being in National Grid USA, as part of the Western Massachusetts Transmission Reinforcement Strategy, 3M are currently investing in expanding manufacturing capacity to meet demand.

Nominated Contact Email Address(es)

box.NG.ETInnovation@nationalgrid.com

Problem Being Solved

Method(s)

Scope

Objective(s)

Key learning to be delivered by the project is the understanding of the circumstances under which the Superconducting Fault Current Limiter (SCFL) can be used to mitigate fault level issues which are a barrier to Distributed Generation (DG) connection and how the SFCL can then be designed into and operated.

Specifically the following learning outcomes would be expected:

- Identification of network and physical circumstances where use of the SFCL could be used to mitigate fault level issues and address potential future DG connection issues
- Identification of design, construction, commissioning, protection, control and operational issues associated with use of such equipment. If the trial proves successful in mitigating faults this could also reduce the need for transmission reinforcements across GB
- Assessment of actual carbon benefits/confirmation of initial carbon case
- Assessment of impact of equipment on policies, codes of practice, section level procedures, financial authorisation processes (including the financial justification) and identification of required revisions.
- Dissemination will be through the production of a manual that details the new knowledge outlined above.

Demonstration Objectives:

This project trials a specific piece of new equipment that has a direct impact on the operation and management of the distribution system and potentially the transmission system.

Phase 1. To identify suitable locations for the SFCL installation and undertake a feasibility and systems readiness study to analyse the network, outline the optimum application and specification, and confirm the business and carbon cases. This has been completed.

Phase 2. To design, build, install and commission a three-phase 33kV SFCL on the CE distribution network. It is proposed, subject to site surveys and agreement with National Grid and other partner organisations, that the unit is installed at a 275/33kV substation in South Yorkshire to limit the fault current to within the rating of the 33kV switchgear. This is currently managed through an operational management switching procedure which in some circumstances may increase the risk of loss of supplies to customers.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

n/a

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

n/a

Geographical Area

Revenue Allowed for the RIIO Settlement

Indicative Total NIA Project Expenditure

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)

n/a

Please provide a calculation of the expected benefits the Solution

n/a

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

n/a

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

n/a

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)

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

Please demonstrate how the learning from the project can be successfully disseminated to Network Licensees and other interested parties.

Please describe how many potential constraints or costs caused, or resulting from the imposed IPR arrangements.<

Please justify why the proposed IPR arrangements provide value for money for customers.

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