

NIA Project Registration and PEA Document

Date of Submission

Apr 2015

Project Reference

Project Registration

Project Title

SF6 Capture and Leakage Repair Technology

Project Reference

Project Licensee(s)

National Grid Electricity System Operator

Project Start

January 2013

Project Duration

-2012 years and 1 month

Nominated Project Contact(s)

National Grid TO Innovation Team

Project Budget

£107,000.00

Summary

National Grid SF6 losses are in the region of 12,000kg per annum from Air Insulated and Gas Insulated Switchgear (AIS and GIS). Given that SF6 has a global warming potential 24,000 times worse than CO2 this results in ~ 306k tonnes CO2eq per annum or circa 30% of National Grid's UK carbon emissions. The majority of these losses come from a few of our largest leakers, often where it is difficult to gain an outage or where our various repair techniques prove ineffective - for example leaks from Littlebrook 400kV substation represents 10% of our UK losses alone.

Nominated Contact Email Address(es)

box.so.innovation@nationalgrid.com

Problem Being Solved

Method(s)

Scope

Objective(s)

The immediate challenge is for a team from across National Grid and external suppliers to review the current leak repair methodology and implement changes to attempt to ensure leak repairs are 100% efficient. Previous experience has identified that this has not

always achievable due to a number of influencing factors.

Where a leak repair, going forward, is not successful a means of capturing the fugitive emissions is required. A methodology has been trialled around a leaking SF6 gas insulated switchgear flange to prove its effectiveness during the latter part of 2012. This method utilised diverting the fugitive emission through an adsorbent material (activated carbon) which once saturated would allow the gas to be reclaimed by further processing. Although this trial was successful its future sustainability is questionable therefore design changes have been made which enable the gas to be collected and pumped into a storage vessel.

Both designs are based around, ideally, not needing an outage to install it, but if an outage is required because the leak infringes safety distances, it should be able to be installed within 2 days to enable installation within a weekend outage. The bottle reclamation principle is being carried forward and a prototype system is currently being designed.

In addition work is being conducted with the University of Liverpool to analyse the carbon captured SF6 to assess its suitability for re-use after reprocessing.

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