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

Jan 2017

Project Reference Number

NIA_SPEN0018

Project Registration

Project Title

Technical Review of Non-conventional Statcom Applications

Project Reference Number

NIA_SPEN0018

Project Licensee(s)

SP Energy Networks Distribution

Project Start

February 2017

Project Duration

0 years and 7 months

Nominated Project Contact(s)

Watson Peat & Albert Santandreu

Project Budget

£60,000.00

Summary

This project will have two work packages:

1. Technical Review

Carry out technical review of Statcom technologies, incorporating learnings from previous projects looking at Statcoms, such as WPD's Lincolnshire Low Carbon Hub project. This will establish an application guide for Statcoms, identifying all of the network characteristics and issues which can be altered using them, with a list of the planning considerations which would be required for Statcom implementation.

2. Sensitivity Studies

Analysis of DIgSILENT Models of networks in the Dumfries and Galloway region in three ways- once as the circuits are currently, once with Statcoms added, and once with traditional reinforcement. This will result in the voltage "hotspots" in the network to be identified, allowing the required size of Statcom and traditional reinforcement required to mitigate these issues. These results will feed into the need case CBA to benchmark the Statcom installation with traditional reinforcement.

Third Party Collaborators

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

Currently, Statcoms have a low level of uptake on the electrical network- most Statcoms are used by industrial customers and generators, and network operators by and large have them as one-off installations which aren't used as the basis for business-as-usual. The number and optimal location of the Statcoms on the network as a coordinated investment by network operators must therefore be considered. In addition, the business case for Statcoms has changed in recent years due to advancements in MOSFET technologies. This business case has not yet been reassessed by network operators, however.

The full potential of Statcoms should be linked and compared with the services provided by conventional assets to network owners/operators.

Method(s)

In the duration of this project, a review of current Statcom technologies will be carried out, with a strategy for taking them from a one-off installation to a business as usual reinforcement option. This will involve investigating whether Statcoms can be deemed a cost-effective alternative to conventional reinforcement for addressing voltage constraints on the network, particularly for the 11kV network. In addition to this review, four sites in Dumfries and Galloway will be studied in DIgSILENT to establish where Statcoms could be optimally located. This project will not cover the installation or implementation of the Statcom system, but will provide the groundwork for such a task for DNOs.

Scope

This project will have two work packages:

1. Technical Review

Carry out technical review of Statcom technologies, incorporating learnings from previous projects looking at Statcoms, such as WPD's Lincolnshire Low Carbon Hub project. This will establish an application guide for Statcoms, identifying all of the network characteristics and issues which can be altered using them, with a list of the planning considerations which would be required for Statcom implementation.

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Objective(s)

The project has a number of deliverable objectives. Firstly, the technical review will produce a progress report with its findings, and will contain the application guide defining the areas where Statcoms could be used to deal with network issues. The second stage will produce both a cost-benefit analysis for the application of Statcoms, and a technical specification for Statcom applications, applicable to all stakeholders.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The delivery of the above objectives, within budget and within agreed timelines, as is reasonable depending on the knowledge at this stage of the development phase.

The project will be managed within SPEN applying due diligence and best practices where appropriate.

The staged outcomes will include reports and specifications available for other licensees.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This project lays the groundwork for the implementation of a Statcom system on the distribution network. The learnings which come from this project come from this groundwork, and the opportunity for removing constraints and improving system balancing come out of this aspect of the project.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

The 11lkV network in Dumfries and Galloway has a wide range of network constraints which provides ample opportunities for the various potential applications for the Statcoms to be implemented. Other areas with similar characteristics may also be considered.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£60,000

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)

It is not possible to estimate the savings from this project at this stage; the cost/benefit analysis will be produced as part of the project.

Please provide a calculation of the expected benefits the Solution

N/A – project is a study, and as such, one of its aims is to identify whether or not Statcoms can be used as a cost-effective method of reinforcement on the network compared to conventional reinforcement.

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

The Scale of the potential roll-out is dependent on the outcome of the project; the number of issues and the cost-effectiveness of Statcoms in handling these issues will determine to what extent each Licensee will want to make use of Statcoms.

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

The rollout costs are not possible to determine at this stage as they are dependent on both the scale of the full-roll out and the end costs of installing and maintaining the Statcoms. These will be able to be identified through the studies carried out in this project.

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

All network licensees face issues with power quality or other power constraints on their network and are looking for new, innovative and cost-effective ways to handle these issues. The result of this project will be applicable to all licensees as it will allow licensees to use Statcoms as a cost-effective way of mitigating these issues. The Specifications produced as part of this will also allow accelerated adoption as it reduces the amount of time required in sizing and specifying the equipment.

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