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

Feb 2016

Project Reference Number

NIA_WPD_012

Project Registration

Project Title

Global Analysis of Smart Grid Telecommunications Solutions

Project Reference Number

NIA_WPD_012

Project Licensee(s)

National Grid Electricity Distribution

Project Start

February 2016

Project Duration

1 year and 2 months

Nominated Project Contact(s)

Gary McElroy – WPD Infrastructure Manager (Telecoms)

Project Budget

£273,717.00

Summary

The supplier will undertake an analysis of Global Smart Grid deployments particularly the Telecommunications infrastructure required to support Smart Grids. The report will focus on identifying and quantifying the following:

- Smart Grid site types
- Smart Grid Layers
- Smart Grid Architecture
- Smart Grid Services
- Smart Grid Data flows
- Smart Grid Security (Physical and Cyber)
- Applicable Telecommunications and IT solutions

Problem Being Solved

Telecommunications Infrastructure will play a pivotal role in enabling Distribution Network Operators transition to a smarter electricity network and ultimately a UK-wide low carbon economy. The Smart Grid will allow greater visibility, control and protection of network assets with enhanced centralised control functions as well as autonomous de-centralised functions. Active and pro-active network management will be essential to optimise the installed assets, whilst meeting the challenges associated with more distributed generation and storage as well as dealing with consumers changing energy demands.

UK Distribution Network Operators are well positioned and highly competent at maintaining and augmenting the conventional telecommunications approaches for Remote Monitoring and Control as well as high speed protection of systems and assets. However, with the increased drive towards a Low Carbon economy within the UK, the way the electricity network is operated has been turned on its head. From a previous operating model from large generator to customer, the proliferation of medium to small scale distributed generation has necessitated a different approach to how the networks are monitored, controlled and protected. Presently, the telecommunications approaches to supporting these new initiatives are adaptions of current systems and bespoke solutions.

This current incremental approach to Smart Grid Telecoms integration can be complicated, costly and undefined in terms of scalability. This project will seek to analyse current and proposed Smart Grid Telecommunications solutions and deployments to assess suitability for integration within the UK DNO's,
taking a holistic view rather than the current incremental approach.

Method(s)

Whilst developing the scope for a 2015 NIC submission, Newcastle University undertook a similar piece ofwork on behalf of WPD, albeit, very focused on papers submitted to the CIRED Conference in Lyon during 2015. The outputs of this piece were interesting in the fact that many Smart Grid initiatives were suffering due to Telecommunications issues. Equally, the outputs identified that many Smart Grid initiatives were being deployed with underdeveloped Telecommunications solutions in a piecemeal or incremental fashion.

This project will take over from where Newcastle University left off and continue the Global research necessary for WPD and the other UK DNO's to take an holistic view of current and planned Smart Grid deployments and make informed decisions regarding Policy or Strategy surrounding Smart Grid deployment in the UK.

Scope

The supplier will undertake an analysis of Global Smart Grid deployments particularly the Telecommunications infrastructure required to support Smart Grids. The report will focus on identifying and quantifying the following:
- Smart Grid site types
- Smart Grid Layers
- Smart Grid Architecture
- Smart Grid Services
- Smart Grid Data flows
- Smart Grid Security (Physical and Cyber)
- Applicable Telecommunications and IT solutions

Objective(s)

The purpose of this project is to complete a comprehensive global analysis of proposed and deployed Smart Grid Telecommunications solutions as well as identifying and quantifying the specific architectures, services and data-flows within the Smart Grid.

By better understanding the Smart Grid as a whole, informed decisions can be made regarding future deployment of Smart Grid solutions and how that will interact with or replace legacy communications systems within the UK Distribution Networks.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

There are multiple success criteria:
- Identifying and quantifying site types to be considered for Smart Grid adaption
- Identifying and quantifying Smart Grid Layers within the DNO
- Identifying and quantifying applicable Smart Grid Architectures
- Identifying and quantifying current and emerging Smart Grid Services
- Identifying, quantifying and characterizing Smart Grid Data Flows
- Identifying and quantifying DNO Smart Grid Security – Physical and cyber security
- Identifying a wide range of Telecommunications & IT systems

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The scale of the project will be global, with no limit to the breadth of investigation, but there is an expectation that we will have a cross

section of results from Europe, the Americas, Russia, Africa, Middle East and Australasia.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

WPD West Midlands; WPD East Midlands; WPD South West; WPD South Wales

Revenue Allowed for the RIIO Settlement

Nil

Indicative Total NIA Project Expenditure

£246,150

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)

Not required for reasearch as set out in paragraph 3.12 ii) of the NIA Governanace Document.

Please provide a calculation of the expected benefits the Solution

Not applicable

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

This research is relevant to all DNOs

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

Not applicable

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

The learning generated from this project will be disseminated to all UK Distribution Network Operators to allow them to compare and contrast current Telecommunications solutions and to make informed decisions with those expected to support Smart Grids.

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 addresses the challenge of evolving beyond current Telecommunications Strategies and preparing for the challenges posed by the evolution of Controlling and Managing fully connected Smart Grids.

☑ 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