

## NIA Project Registration and PEA Document

*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.

### Project Registration

**Project Title**

Global Analysis of Smart Grid Telecommunications Solutions

**Project Reference**

NIA\_WPD\_012

**Project Licensee(s)**

Western Power Distribution East Midlands, Western Power Distribution South Wales, Western Power Distribution South West, Western Power Distribution West Midlands

**Project Start Date**

Feb 2016

**Project Duration**

13 Months

**Nominated Project Contact(s)**

Gary McElroy – WPD Infrastructure Manager (Telecoms)

**Project Budget**

£273,717

**Problem(s)**

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 adaptations 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 of work 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.

## 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

## Technology Readiness Level at Start

2

## Technology Readiness Level at Completion

3

## Project Partners and External Funding

None

## Potential for New Learning

The outcomes from this project will identify, quantify and characterize the current and proposed Smart Grid Telecommunications solutions, in design and deployed at a global level.

This in turn will form the base criteria for selecting appropriate technologies to assess for trial in stand-alone mode or as part of new LCN projects which are best suited for the UK DNO environment.

## 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.

## Geographical Area

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

## Revenue Allowed for in the RIIO Settlement

Nil

## Indicative Total NIA Project Expenditure

£246,150



## Project Eligibility Assessment

### Specific Requirements 1

**1a. A 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 systems and 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

### Specific Requirements 2

**2a. Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees**

**Please answer one of the following:**

i) Please explain how the learning that will be generated could be used by relevant Network Licenses.

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.

ii) Please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the Project.

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.

**2b. Is the default IPR position being applied?**

Yes

No

**If no, please answer i, ii, iii before continuing:**

i) Demonstrate how the learning from the Project can be successfully disseminated to Network Licensees and other interested parties

ii) Describe any potential constraints or costs caused or resulting from, the imposed IPR arrangements

iii) Justify why the proposed IPR arrangements provide value for money for customers

**2c. Has the Potential to Deliver Net Financial Benefits to Customers**

i) Please provide an estimate of the saving if the Problem is solved.

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

ii) Please provide a calculation of the expected financial benefits of a Development or Demonstration Project (not required for Research Projects). (Base Cost – Method Cost, Against Agreed Baseline).

Not applicable

iii) Please provide an estimate of how replicable the Method is across GB in terms of the number of sites, the sort of site the Method could be applied to, or the percentage of the Network Licensees system where it could be rolled-out.

This research is relevant to all DNOs

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

Not applicable

#### 2d. Does Not Lead to Unnecessary Duplication



i) Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

Research has shown that no electricity licensees have identified any projects which may cause duplications. The outputs of this project will be disseminated to all UK DNOs.

ii) If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

Not applicable