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

Aug 2017

### Project Reference Number

NIA_NPG_019

## Project Registration

### Project Title

Customer-Led Distribution System

### Project Reference Number

NIA_NPG_019

### Project Licensee(s)

Northern Powergrid

### Project Start

September 2017

### Project Duration

3 years and 10 months

### Nominated Project Contact(s)

Liz Sidebotham, Northern Powergrid

### Project Budget

£1,915,000.00

### Summary

The scope encompasses:

- the future industrial structure;
- distributed energy markets and distributed network management;
- customised energy products; and
- the DSO roles, functions and interactions with the owners/operators of DERs, with other DSOs, and with other network operators (eg IDNOs, private wire operators) and the TSO

### Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

### Problem Being Solved

The transition from Distribution Network Operator (DNO) to Distribution System Operator (DSO) is a complex issue with many possible options for restructuring the distribution sector. Identifying the most appropriate industrial structure that can achieve the best whole system outcome for customers requires advanced understanding of interplays between the operation of markets for energy and for network services, network operation, infrastructure development and the growth of distributed energy resources (DERs).

We will address the problem of how to accommodate large volumes of DERs at the least cost while at the same time delivering value to DERs so that they can thrive in market-based conditions.

### Method(s)

A literature review covering UK and international projects and developments (including LCNF and NIC/NIA projects).

Academic innovations in smart distribution eco-systems, local energy markets and distributed energy markets/systems.

System modelling of flows of energy, payments, and information.

Laboratory demonstration of the interplays between market operation, network operation against a range of industrial structures, infrastructure development and DER growth, based on real networks.

## Scope

he scope encompasses:

- the future industrial structure;
- distributed energy markets and distributed network management;
- customised energy products; and
- the DSO roles, functions and interactions with the owners/operators of DERs, with other DSOs, and with other network operators (eg IDNOs, private wire operators) and the TSO

## Objective(s)

Our objective is to identify and demonstrate the most appropriate market design and industry structure that will:

- Enable the optimisation of network and DER resources;
- Enable 3rd party providers to realise maximum value of DERs through market-enabled energy and network products; and
- Enable the uncertainty and complexity of the supply system to be substantially reduced by distributed and coordinated market and network solutions.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

Delivery of:

1. A report on possible future industrial structures for the distribution sector that promote an efficient and coordinated and flexible energy system;
2. A report on possible market designs and market structures for DER energy products;
3. Coordination strategies between network operation and energy market operation to optimise network and DER resources;
4. A report on how the operation of a DER energy market might change DER behaviour and its impact on network operations and on the market for network services;
5. A roadmap showing the interplays between DER growth, market development, infrastructure development to support the structural change, using a sample network from NPg;
6. A quantification of the value to stakeholders from introducing energy markets to the distribution sector; and
7. Dissemination and engagement activities, including close engagement with the Open Networks project so that CLDS can support, enhance and extend the work of the Open Networks project.

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

## Scale of Project

Desktop study, and laboratory demonstration using Northern Powergrid data.

## Technology Readiness at Start

TRL3 Proof of Concept

## Technology Readiness at End

TRL4 Bench Scale Research

## Geographical Area

Desktop study, and laboratory demonstration using Northern Powergrid data.

## Revenue Allowed for the RIIO Settlement

None

## Indicative Total NIA Project Expenditure

£1.6m

# 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)

This is a knowledge development project which will propose market models to optimise the overall efficiency of the distribution system therefore identifying considerable savings. The learning developed by the project will identify optimal models for the market so savings cannot be estimated at this stage.

## Please provide a calculation of the expected benefits the Solution

N/A – this is a knowledge development project.

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

The learning from project will be transferable to all other Network Licensees.

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

None.

## 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 will help other Network Licensees to understand the value from introducing energy markets to their distribution licence areas, when this might be appropriate, the technical infrastructure required to achieve this, and the impact of the energy market on their operation of their distribution network.

### Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIIO-1 only)

Our innovation strategy includes a programme of activity to use customer flexibility for societal, network and customer benefit. This project directly addresses that challenge.

☑ 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