

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

Nov 2014

### Project Reference Number

UKPNT206

## Project Registration

### Project Title

Kent Active System Management (KASM)

### Project Reference Number

UKPNT206

### Project Licensee(s)

UK Power Networks

### Project Start

January 2015

### Project Duration

3 years and 0 months

### Nominated Project Contact(s)

UKPN Innovation Team

### Project Budget

£3,898,000.00

## Summary

The last few years have seen a number of Grid Supply Points come under pressure from the level of generation on the distribution networks exporting their power. This is the most extreme form of the electricity network operating in the opposite way to which it was originally designed, where sections of the network are not only supplying their own demand but also exporting the surplus onto the transmission system.

The area of Kent being considered in this project contains only two GSPs of the >350 nationwide, and a third is being established in the area. Nevertheless, it currently requires 34 contingency scenarios to be analysed in order to understand it fully.

The introduction of wind, solar, and the presence of interconnectors increases the number of extremes that need to be analysed - there is no longer a simple 'day of highest winter demand' and 'day of lowest summer demand'. There are therefore more extremes; a greater requirement to monitor all contingencies; and a growth in the number of GSPs being affected.

Contingency analysis is a valuable tool to predict the effect of outages like failures of overhead lines and to take actions to keep the distribution network secure and reliable. UK Power Networks will trial for the first time the use of contingency analysis in the GB electricity distribution network. It will also be the first trial of the implementation on a coordinated and interfaced basis with the electricity transmission network.

The KASM project will tackle and demonstrate the value of contingency analysis software in operational timeframes on the network in East Kent, delivering conservatively estimated net benefits of £0.6m. Once proven successful, replication of this method across GB could conservatively provide net benefits of over £65m over the lifetime of the investment, when compared to business-as-usual approaches.

### Nominated Contact Email Address(es)

innovation@ukpowernetworks.co.uk

## **Problem Being Solved**

## **Method(s)**

## **Scope**

## **Objective(s)**

Distribution networks are designed to security standards that ensure redundancy in components and supply points. Distributed generation such as on-shore wind and solar photovoltaic (PV) relies on an up-stream connection to export its power, and can therefore be affected by both maintenance and construction outages and outages caused by faults unless there is a redundant or alternate route for its power.

As such, there is a strong focus within Distribution Network Operators (DNOs) to find contingency plans to avoid or shorten maintenance outages; to restore demand customers; and to maintain routes for generation in event of a fault.

This role within DNOs, starts with the network planners who design the network at the desk, and respond to new connection requests by identifying points of connection to the network.

The role continues with outage planners, who specialise in maintaining and optimising the programme of outages to best serve customers. Finally, control engineers who monitor the network in real-time, issue and manage safety permits to staff working on the network, and respond to faults by reconfiguring the network.

The set of activities described above is generally referred to as 'outage planning' and 'contingency analysis' and has been carried out by the GB DNOs for many years. However, these are now being carried out in a significantly different context, in particular taking the effects of distributed generation into account.

The UK Renewable Energy Roadmap set out a comprehensive target for 15% of the electricity generated in the UK to come from renewable energy sources by 2020.

The targets established in 2011, were reaffirmed in 2013. A significant number of these new renewable energy sources will connect directly to the distribution network. The UK's policy is part of the overall European Union (EU) target of achieving 20% penetration by renewable energy sources in total energy consumption by 2020. UK Power Networks' South Eastern licence area has, for example, 100 large-scale solar photovoltaic plants with a combined capacity of 1140 MW awaiting connection to the network, which will more than double the amount of distributed generation in the area.

## **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