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

May 2019

Project Reference Number

NIA_SPEN_0040

Project Registration

Project Title

Improving Storm Resilience and Readiness through Data Analytics

Project Reference Number

NIA_SPEN_0040

Project Licensee(s)

SP Energy Networks Distribution

Project Start

June 2019

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Andrew McDiarmid

Project Budget

£150,000.00

Summary

In this project, we will deveop an analytic model which will allow effective management of resources during storm resources

Third Party Collaborators

GE Grid Solutions

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Problem Being Solved

Storms can represent a major challenge to utilities, often posing major threats to continuity of supply to customers, and with the potential to cause major damage to network assets. Currently, utilities act in a responsive manner to storms, relying on customer reports to know where work and action is required. The rollout of smart meters and other smart technology has helped improve reaction times to these issues, but in the future, utilities will need to work in a more proactive manner to ensure fast restoration of customers and efficient use of resources.

Method(s)

In this project, we will trial a data analytics application, which uses localised weather models, historical outage data and asset records (among other data sets) to improve the accuracy of prediction of where storms may affect the electrical network. This will act as a proof of value of the models, which can then be evaluated and validated prior to rollout across the business.

Scope

The analytics application will take outage and GIS data, and combine with historical and current weather datasets for the SPD region

to provide a predictive model for whether a postcode area is forecast to have an outage, and what the severity of this outage will be. This will then be displayed graphically using the GIS data.

Objective(s)

The main objectives for this project are as follows:

1) Development of a data requirements specification, including a target mapping document, and assessment of data source quality.

2) Development of a pilot of the Analytic model to allow trial via a storm readiness application. This will also include machine learning algorithms to allow continuous improvement.

3) Development of a dashboard to allow the model outputs to be viewed as a map and with KPI indicators. This will also allow previous storm data to be “replayed” to allow it to be viewed and analysed.

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.

Project Partners and External Funding

This project will be carried out in partnership with GE.

Potential for New Learning

This project will provide an understanding of how storm damage and outages can be predicted and proactively managed as a step away from the current, reactive methods for storm ramp-up management.

Scale of Project

This project will be carried out using data for the full SPD Region to allow the impact of the system to be understood for the full area covered by the SPD network.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

As above, the trial will cover the full SPD area.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£150,000

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)

An estimate is difficult to give in this circumstance as we are trialing this method; however, if the analytic model is successful, we will be able to reduce customer outage time by proactively stationing resources to handle faults which arise. This will reduce CI and CML in storm conditions, and allow for improved customer satisfaction.

Please provide a calculation of the expected benefits the Solution

As per above, it is difficult to estimate savings without an analysis of previous storm and outage data to allow this to be estimated.

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

The method would be fully replicable by the other Licensees; the only requirement would be an analysis of the data and data quality held by the licensee to ensure that it will fit into the analytical model.

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

The cost of a GB rollout is dependent on the work required for each Licensee, and is therefore dependent on the available data and its quality, and what work is required to fit this into the analytical model.

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 Licensees face the challenges outlined above regarding storm management, with the need to move to proactive management of resources and planning. This project will give other licensees an understanding of the effectiveness of the weather-based predictive system, allowing them to assess whether to adopt this into their business activities.

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.

Previous projects which have looked at the use of weather have concentrated on the use of this data to predict generation load and demand on the network, or for modelling the capacity of OHL conductors. This project will concentrate on a different area, using weather data to predict physical faults on the network during storm conditions.

There has been a previous project, carried out by UKPN, which has used weather data for management of resource deployment. This project will develop on the outputs of the UKPN project, and will focus more on the impact of storm events on the network. In addition, we will use machine learning in this project to help increase and improve the accuracy of the data analytics system.

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

This project is innovative as it allows a move from the current model of reactive deployment of resource in storm conditions to a proactive deployment method. This will allow more effective management of storm conditions and storm situations.

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

This is to be carried out not as BAU due to the demonstrative nature of this project as a proof of value, and due to the potential for learning to affect all other licensees.

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

There is a level of commercial risk involved with this project; while we expect significant benefits from reductions in CI and CML, it is possible that these will not be significant enough to meet the costs of the project, depending on the future weather conditions – that is, it is possible that the increased instances of storm conditions in recent years will decline, leading to low usage of the predictive system from fewer periods where it is required.

This project has been approved by a senior member of staff

☑ Yes