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 2018

Project Reference Number

NIA_SGN0121

Project Registration

Project Title

Hypercube

Project Reference Number

NIA_SGN0121

Project Licensee(s)

SGN

Project Start

January 2018

Project Duration

0 years and 9 months

Nominated Project Contact(s)

Hector Salgado, Innovation Project Manager

Project Budget

£94,000.00

Summary

SGN NIA project to develop a Network Analytic Platform (NAP) model which will integrate within existing NAP's, as well as developing a GIB (Gas in Building) event algorithm.

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

The Gas Distribution Networks (GDNs) are approximately half way through a programme to replace its metallic assets with Polyethylene (PE), where the programme is forecast to finish in 2032. This is to improve safety and efficiency within the gas grid in accordance with legislation (PSR). The planning and prioritisation of replacement projects is based on a formula imposed by Ofgem using a mechanism known as Mains Risk Prioritisation System (MRPS), which factors Gas in Building (GIB) events into its calculation. The GDNs have been replacing deteriorating metallic assets, and between 2003 and 2016 the number of GIBs events has been falling. However GIB events could potentially be reduced further if new analytic/ statistical methods are implemented.

Method(s)

This project will aim to develop a Network Analytic Platform (NAP) model which will integrate within existing analytic platforms, as well as developing a GIB event algorithm. The NAP will be designed to support addition of new data sets, create new analysis models and dashboards to further help network decision making.
Development of a further analytic model will be used to assess GIB events. The GIB analytic model will involve carrying out an assessment of GIB events; developing a greater understanding of the factors that results in GIB events; quantify their effect, and identify if possible concrete measures to reduce the number of GIB events.
The project has been split into two packages which include:
SGN GIB Trend Analysis

- Undertake a series of multivariate analyses.
- Complete a deep dive analysis of iPRE trends.

- Carry out statistical analysis.
- Develop GIB dashboard.
- Develop final project report and user manual.

SGN Network Analytics Platform (NAP)

- Create requirements for the NAP and gather additional data.
- Create cloud service.
- Develop NAP.
- Develop final project.
- Carry out training.

Scope

This project will aim to build upon existing SGN data by extending the number of explanatory variables and developing a NAP which will use rule mining analytical techniques utilising Hypercube software platform.
To support future analysis of GIB events, a dashboard will be added to the already existing SRH and iPRE dashboards. These dashboards use similar information and help analyse, provide insights and report on developments of these important regulatory performance criteria.
The NAP model will use a cloud based system for the visualisation.

Objective(s)

This project will include:

- Data gathering and cleansing.
- Data analysis including user stories and data sources gathered from iPRE and SRH.
- Create dashboard and test data.
- Complete full project report including user instructions and training.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The following success criteria for the project are:

- Demonstrable models.
- Provide a solution that supports the programme to replace its metallic assets with PE.
- Integration of the models into and integration of analytic accuracy.
- Create dashboard and complete testing.
- Completion of a full project report.
- Completion of a user instructions and training.

Project Partners and External Funding

BearingPoint

Potential for New Learning

The project is expected to develop the following new learning for Network Licensees:

- Provide all GDNs with further understanding of GIB events.
- Build upon existing SGN data by extending the number of explanatory variables.
- Integration of newly developed dashboards and NAPs into existing systems.
- Develop a robust NAP model which will integrate existing analytic models.
- Analytically assess the GIB events.

Scale of Project

The project involves gathering data and creating a robust NAP.

Technology Readiness at Start

Technology Readiness at End

TRL2 Invention and Research	TRL3 Proof of Concept

Geographical Area

The software will be applicable to SGN's Scotland, South and South East Networks, but outputs and method can be shared with all GDNs.

Revenue Allowed for the RIIO Settlement

No revenue was allowed for this work under RIIO, however, GIB events feed into network risk and the overall replacement program.

Indicative Total NIA Project Expenditure

The total project expenditure is £90,600, 90% (£81,540) of which will be recovered via the NIA funding mechanism in line with the funding conditions.

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 project is at a low TRL and it is therefore not possible to provide an accurate estimate of the potential saving to customers at this stage.
SGN are over half way through the GD1 iron pipe risk management programme. As part of RIIO-GD1 there currently remain over 2,000km of tier 1, 2 and 3 pipes that are required to be risk managed, including replacement.
In GD2 we expect, as a minimum, a further 8,000km of iron pipe to be considered.
The planning and prioritisation of replacement projects is highly dependent upon the insights that we can gain from our asset data and how this is used to optimise the balance between cost to customers and risk management.
The development of GIB Trend Analysis and NAP within this project will seek to assist the mains replacement program as well aiming to help reduced pipe failures and resulting GIB events.

Please provide a calculation of the expected benefits the Solution

N/A

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

The potential outcomes of this project are applicable across GDN's. All the network licensees will have experienced GIB events and will also be working on the programme to replace its metallic assets with PE.

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

Recurring cost after the completion of the Network Analytics NAP to be around £1,200/year, Annual user and maintenance cost for Tableau is £420 per user per year. Maintenance and minor changes to the platform of about £10,000.

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

This project applies to all GDNs focusing on GIB events.
All Network Licensees will be able to use the learning from this project as the outputs will be presented in a clearly defined report that will be available to them on request, this will allow the network licensees to make informed choices as to whether to invest in this software.

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.

A review has been made of all other Network Licensees and no other similar projects have been identified.

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