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 2020

Project Reference Number

NIA_NGN_245

Project Registration

Project Title

Schematics – Phase 2

Project Reference Number

NIA_NGN_245

Project Licensee(s)

Northern Gas Networks

Project Start

February 2020

Project Duration

0 years and 9 months

Nominated Project Contact(s)

Liam Kelly & Pete Crosier

Project Budget

£290,000.00

Summary

Northern Gas Networks (NGN) engineers use schematics to quickly get an overview of asset locations and sequences when responding to incidents. Schematics are a simplified view of the gas distribution network similar to a London Underground Map.

Historically, at NGN, Schematics are printed on paper and manually created in a CAD system, using an old GIS data extract, for reference. Over time the CAD and GIS systems have become out of sync with data updates being applied in one system and not in the other.

This is causing an operational risk to NGN as field engineers are making decisions based on schematics, which are potentially missing key information. Also, there is no uniform design for schematics; they can vary across operational areas, making them difficult to understand if you're not unfamiliar with a particular area.

Schematics are useful for planning and emergency response purposes. The generation of schematics has historically been done using manual CAD drawing tools and is an expensive and time-consuming process. As soon as the network data changes then the schematics become out of date and old versions continue to be used.
The use of old schematics creates risk to safety and reduces the efficiency of planning and maintenance, but it is prohibitively expensive to update the schematics by hand. The only viable long-term solution to schematic maintenance is to generate them automatically from the live network data.

Third Party Collaborators

1Spatial

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Northern Gas Networks (NGN) engineers use schematics to quickly get an overview of asset locations and sequences when responding to incidents. Schematics are a simplified view of the gas distribution network similar to a London Underground Map.

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Method(s)

This project is phase two of the predecessor, Data and Schematics Improvement NIA project.
The completed first phase was about understanding, cataloguing and improving NGN's current schematic position and proposed further work required to implement and automate a solution. The first phase was a success, but this second phase is required to build a prototype schematic generation system.
This project is to develop a prototype for a configurable rules-based process that will automatically generate PDF schematics for the network.

Schematics are a very complex type of artefact to generate, especially so with any degree of automation.

The project will deliver the set of schematics in PDF form as described in this document to allow NGN to assess the outputs and decide whether the schematics process could, in principle, be subsequently deployed for operational use.

Also, to understand from NGN's evaluating users whether any additional phases are needed in order to implement enhancements or meet additional requirements before any application built and used to generate schematics on demand and deployed into NGN for operation use can proceed.

1Spatial will build an Oracle database in its own, Cambridge-based, environment that will contain NGN's asset information and data from Ordnance Survey that NGN has licensed.

The deliverables will be limited to the production and delivery of 73 schematic drawings in the form of PDF documents.

Scope

The scope of this project is the:

• Development of an automated process that generates 73 schematics directly from NGN GIS data, and which can then be viewed in PDF format.
• Development of an automated process that generates all schematics directly from NGN GIS data which can be viewed in PDF format.

Objective(s)

The project objectives are:

• Reduce operational risk by improving the currency of schematics (by generating them from live data)
• Ensuring schematics are uniform in design (and so support more consistent provision of information)
• Shortening the time to produce schematics and removing the risk of data errors being introduced to schematics (by removing the otherwise labour-intensive process)

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will deliver:

• PDFs generated for all the zones in the schematics table within 24 hours
• PDFs generated individually for all the zones in the schematics table
• All the assets within the zone appear on the schematic
• All the assets on the schematic are styled as defined
• Labels created as defined
• The final report adequately describes the project deliverables and findings; and presents post-completion recommendations for any further work
• Costed schematics production recommendations and options report

Project Partners and External Funding

Northern Gas Networks and 1Spatial Limited.

Potential for New Learning

The learning that can be derived from the development of a GIS-based solution to address majority of schematic issues is in the form of technology driven evidenced based data analysis, followed up with full desktop analysis of MP schemes delivered since 2013.

The project will provide an understanding of the capabilities that computer-based rules engines can offer in terms of this situation to allow for suitability assessment.

Scale of Project

The project will develop an automated process to generate schematics directly from NGN GIS data, which can be viewed in PDF format. The scale of the project is reflective of evidencing feasibility.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL5 Pilot Scale

Geographical Area

To ensure the scale is proportionate to the desired outcome, the project will be limited to NGN's operational network.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External funding = £264,000

Internal cost = £26,000

Total Cost = £290,000

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)

The results of this feasibility study will provide options to enable future projects to engineer solutions and therefore will be primarily qualitative. Financial benefits will only be able to be calculated on delivery of the project.

Please provide a calculation of the expected benefits the Solution

This is a research and feasibility project

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

All networks currently utilise manually created schematic drawings and therefore will subsequently learn from the developments of this project.

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

This is a research and feasibility project, costs are unknown at this

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 solution from this phase of the project will provide learning for all Network Licensees in relation to mapping data and the use of technology systems. All networks currently utilise manually created schematic drawings and therefore will subsequently learn from the developments of this project.

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.

Several duplication checks have been undertaken to satisfy the proposed project is new and novel to the GB gas industry.

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

Only following the recent advancements in digital mapping technology has the potential for this project become a potential reality.

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

We recognise the need to build upon and improve our current method of recording and managing MP schematics and associated

date. However, this feasibility study is low level TRL and the outcomes are uncertain. Clarity is needed to evaluate future potential benefits.

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

The level of uncertainty involved in this low TRL project, creates a commercial risk beyond the appetite of the business.

This project has been approved by a senior member of staff

☑ Yes