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## NIA Project Registration and PEA Document

### Date of Submission

Apr 2018

### Project Reference Number

NIA\_SGN0122

## Project Registration

### Project Title

Pressure Control and Management

### Project Reference Number

NIA\_SGN0122

### Project Licensee(s)

SGN

### Project Start

April 2018

### Project Duration

3 years and 1 month

### Nominated Project Contact(s)

Mark Skeritt, Innovation Project Manager

### Project Budget

£1,701,308.00

## Summary

SGN rely on several Pressure Control and Management (PC&M) systems to operate their Gas Networks, however, some of this technology is outdated and reaching the end of its design life. Consequently, it will not be possible to continue maintaining them for much longer. These PC&M systems are specifically designed to ensure that Network pressures are sufficiently optimized to ensure maximum Network efficiency is constantly maintained by reacting to downstream demand.

### Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

## Problem Being Solved

SGN rely on several Pressure Control and Management (PC&M) systems to operate their Gas Networks, however, some of this technology is outdated and reaching the end of its design life. Consequently, it will not be possible to continue maintaining them for much longer. These PC&M systems are specifically designed to ensure that Network pressures are sufficiently optimized to ensure maximum Network efficiency is constantly maintained by reacting to downstream demand.

Additionally, there are a significant number of Pressure Reduction Installations (PRIs), aka Gas Governors or Gas Regulators, installed across SGNs Networks which do not currently have any form of PC&M system applied and many of these sites are subject to manual 'seasonal' adjustments by skilled personnel who visit each of these sites approximately 4 times per year.

It would, therefore, be advantageous to develop an alternative and more efficient means of controlling Network pressures, that not only matches the ability of existing technologies, is sufficiently cost effective to enable installation on more PRIs, but also demonstrates this new technology can rival/supersede the existing systems.

## Method(s)

This project consists

- Conceptual design – Complete and provide a detailed conceptual design to meet the requested performance criteria. This will involve completing a risk assessment and gap analysis of the conceptual design against relevant aspects of primary and secondary

legislation, SGN, Gas Industry, British and European

- Manufacture prototype – This includes carrying out a review against criteria established and approved by SGN during the design stages for offsite
- Method statement – Following completion of the off-site testing, incorporate any design revisions as required and prepare a detailed comprehensive method statement with relevant supporting evidence in accordance with SGNs internal technical assurance and governance processes (as necessary), to enable approval for the proposed live field trials and the proposed concept
- Live trials – Live field trial sites to be carried out on at least five SGN PRI
- Reports – Prepare several Project reports including Construction and Maintenance Work Instructions, training packages and regular progress reports.

## Scope

This Project will aim to develop a more efficient and reliable PC&M system, that will also ultimately allow for remote adjustment of PRI assets. Development of a more efficient control system will be expected to help reduce environmental impacts, as well as reduce call out and regular planned visits for seasonal adjustments, plus helping to free up maintenance teams to perform other essential tasks, thereby lowering carbon footprint even further.

The Project will initially focus on District Governors (DGs) operating within SGNs <2Bar Gas Distribution Networks; however, it is anticipated that the unique PC&M system, developed within this project, will also have wider compatibility and application across other pressure tiers >2Bar. Completion of a detailed conceptual design, risk assessment and gap analysis, as well as manufacturing a prototype for offsite testing, will also form important aspects of the proposed Project plan.

The live field trial stage, involving the undertaking of field trials at five of SGNs DG sites, will be supported by the production of a detailed comprehensive method statement and training package. Once the field trials have been completed it should then be possible to make a further assessment regarding whether the newly developed technology will also have potential for application to other Gas Network pressure tiers >2Bar.

Proposed modifications to the original design, realised during the initial field trial stage of the project, will also be assessed and proven by undertaking a series of additional field trials across SGN's networks.

As before, all field trials will be fully supported by the production of detailed comprehensive method statements and an accompanying training package.

To enable this additional tranche of work to be properly delivered, extra funding and time has also now been allocated to the Project.

## Objective(s)

This project will include:

- Detailed conceptual design.
- Risk assessment.
- Gap analysis.
- Manufacturing a prototype for offsite testing.
- Carrying out at least five live field trials.

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

n/a

## Success Criteria

The following success criteria for the project are:

- Completion of conceptual designs.
- Manufacture of a prototype ready for field trials.
- Supporting method statement and documentation for field trials.
- Successful completion of five live field trials.
- Develop a more efficient PC&M system.

## Project Partners and External Funding

Utonomy Ltd

## Potential for New Learning

The aim of the Project is to develop the following new learning for Network Licensees:

- Provide all GDNs with further understanding of PC&M systems.
- Provide all GDNs with a cost-effective, long-term and viable solution for replacing any outdated and/or inefficient control systems.
- Develop a new and unique PC&M system that is not only more efficient than existing systems, but also enables Network operators to

confidently exercise 'real-time' control over their Governor assets.

## Scale of Project

This Project could not be carried out on a smaller scale: The PC&M system developed by this Project will be subject to live field trial testing at no less than five DG sites to prove capable Network synergy can be achieved.

## Technology Readiness at Start

TRL4 Bench Scale Research

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

This Project will focus on undertaking live field trials within SGN's Southern Networks; however, the findings from this Project and ultimately the 'proving' of this technology to be suitable for use on SGN's networks, is also expected to have application for all GDNs.

## Revenue Allowed for the RIIO Settlement

During RIIO-GD1 SGN will be required to attend a variety of PRIs to carry out seasonal adjustments and maintain existing PC&M systems.

For example, DGs are included within SGNs PRI portfolio and in 2017/2018 SGN spent approximately £2m on maintaining DGs in their Southern (SO) Network; included within this expenditure is the remedial work need to repair or replace PC&M systems.

Whilst no direct saving is expected during the Project, it is anticipated that successful completion will have the potential to deliver savings, regarding the time and money usually associated with maintaining SGNs PRIs and their associated PC&Ms.

## Indicative Total NIA Project Expenditure

The total expenditure is £1,701,308 90% (£1,531,177) 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)

There are approximately 960 DGs in SGNs SO Network that are currently subject to manual seasonal adjustments and a further 200 DGs currently controlled by outdated PC&M equipment. Therefore, assuming each DG is, or will need to be, visited four times a year to carry out pressure adjustments and if SGN were able to implement a more efficient PC&M system for all of them, then it should only be necessary to visit each site once a year following implementation; thereby providing SGN with potential to make significant savings on its maintenance costs.

Additionally, coupling the reduction in annual maintenance visits with an anticipated upturn in Network optimisation/efficiencies, through enabling remote control capability for each DG, is again expected to create further significant savings for SGN.

This estimate is based on a snapshot of SGNs PRI portfolio and is also ultimately dependent on how many of the new PC&M systems are finally installed; however, it has also been determined that cost savings will be expected to increase further as more of these systems are potentially adopted by SGN in the long term.

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

A more in-depth understanding of the financial benefits that could ultimately be achieved, through SGN implementing this innovative technology, is an expected output of this Project. However, for the purposes of calculating the initial expected financial benefits, this estimate has been purely based on the costs associated with SGN managing its SO Network more effectively, using the new and unique PC&M system on around 1000 to 1400 x DGs.

The base cost breakdown below shows the calculation for 1000 to 1400 x DGs in SGNs SO Network being fully remediated using the new technique by the end of RIIO-GD1.

#### Base Cost

Estimated SO Network DG maintenance 'base' cost over 3yrs (2018 to 2021) - £6m

#### New Method Cost

Estimated SO Network maintenance 'new method' cost over 3yrs (2018 to 2021) - £2m

#### Total Savings

Total estimated revenue increase by 2021 - £4m

Whilst this estimate provides an indication of potential applicability, it is important to note that it is also based on several 'unqualified' assumptions and is therefore subject to a large sensitivity margin. These figures are also based on averages and estimates, rather than real network data. Furthermore, the complexities associated with calculating shrinkage will vary from Network to Network, each

Network Licensee having their own Asset Management and Network strategies which could be subject to an array of positive and/or negative influencing factors.

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

All Network Licensees have PC&M systems installed within their respective networks, which should make the Method fully replicable across the GB Gas Industry.

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

This information will be determined following the submission of the final report, because this element has been defined as one of the criteria to be achieved.

### 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

Through this project SGN will evaluate an alternative solution to existing PC&M technologies, a solution which it is believed will bring a variety of additional benefits for all Network Licensees.

All Network Licensees will be able to use the learning from this Project because the outputs will be presented in a clearly defined report that will be available to them on request, this will allow the other Network Licensees to make informed choices as to whether they also want to invest in this technology.

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

**Reliability and maintenance;** Mains replacement through mains insertion is the primary method SGN uses to achieve the mains risk reduction targets set by the HSE. This creates a scenario where by network system pressures must be effectively managed to reduce leakage but also support continuity of supply.

Maintaining this balance can be challenging as capacity restrictions resulting from the insertion process can be managed through pressure increases as the length of PE steadily increases across each system as its gradually replaced (inserted).

Pressure control and management is key area where improvements in the technology will hopefully allow DNOs to better react to the changes in the physical networks and variation in gas demand levels which can knock off the required balance. Development of new pressure management technology also supports the longer-term aspirations of SGNs Real time networks NIC project.

- 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 Licensee Projects and no duplicate 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

The proposed new technology being offered by the main Project Partner for trialling and proving this new concept through this Project is unique and has never been tried before across the GB Gas Industry. SGN will actively support the main Project Partner with the development of their initial concept, to in turn enable a working prototype to be manufactured during the Project that can be effectively trialed on SGNs Network.

### 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

There is no immediate solution currently available to remedy the obsolete PC&M system issue faced by all GDNs and existing technology alternatives do not offer best economic value, nor are they considered wholly reliable. Although it is anticipated that the proposal being evaluated under this Project will offer a viable solution to this problem, the technology has not yet been trialed within the GB Gas Industry and is therefore considered to be a 'Research & Development (R&D)' project, entirely in keeping with expected NIA eligibility requirements, but not currently appropriate to consider funding through business as usual (BAU) activities.

### 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 NIA funding mechanism is specifically designed to support Projects that have potential to have a direct impact on the Licensees Network and/or its Operations, and this Project proposal unquestionably meets the required NIA eligibility criteria. Albeit considered to be unlikely, a specific business risk exists for this Project, should we fail to produce a viable and potentially marketable solution that fully meets the need of the GDNs. However, the amount of knowledge and learning expected to be captured during this Project should also enable positive follow-up work to be undertaken by the GDNs if necessary, to ultimately identify a final solution to the problem definition.

### This project has been approved by a senior member of staff

Yes