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

Jun 2020

Project Reference Number

NIA_NGN_279

Project Registration

Project Title

ServiSWAP

Project Reference Number

NIA_NGN_279

Project Licensee(s)

Northern Gas Networks

Project Start

June 2020

Project Duration

1 year and 10 months

Nominated Project Contact(s)

Thomas McPhearson

Project Budget

£182,904.00

Summary

Current methods for service transfers during mains replacement require that the gas customer is isolated from the gas supply during works. This disconnection requires access to the property, interruption to supply and a purge and relight.

This proposal outlines the development of ServiSWAP, a technique and equipment to enable the transfer of services without interruption to gas supplies and minimal access to the property. The technique is envisioned as a solution to reduce customer contact time and maintain social distancing requirements during customer facing works. This solution is particularly applicable to polyethylene services and could be developed to target more challenging steel, copper and lead services.

Nominated Contact Email Address(es)

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Problem Being Solved

Current methods for service transfers during mains replacement require that the gas customer is isolated from the gas supply during works. This disconnection requires access to the property, interruption to supply and a purge and relight.

This proposal outlines the development of ServiSWAP, a technique and equipment to enable the transfer of services without interruption to gas supplies and minimal access to the property. The technique is envisioned as a solution to reduce customer contact time and maintain social distancing requirements during customer facing works. This solution is particularly applicable to polyethylene services and could be developed to target more challenging steel, copper and lead services.

Method(s)

(NIA_NGN_238). The technology and learning from this project will be used to develop the enclosure for modifying service pipework to target zero interruption service transfer.

The focus is aimed to target properties where gas customers may be self-isolating or shielding and property access is not feasible. A single property that is unable to be accessed can stop the mains replacement activities as potentially vulnerable isolating customers cannot be left without gas supply.

The methodology here is aimed to enable the transfer of these service as part of the Repex program by enabling live service transfer using NGN project zero flexible enclosures.

The key concepts that can be transferred from project zero are the flexible enclosure manufacturing, the sealing methodology and the novel seal arrangement that allows a gas tight seal against variable and poor condition pipework. Both elements of the core technology are likely to need development to be applied to the exhumed service pipe.

The enclosure is aimed to provide a solution to support the current response to the COVID-19 outbreak but can be further applied to provide a solution to minimise the impact and inconvenience to customers during ordinary mains replacement works.

Scope

The aim is to target 20 & 25mm PE with rapid concept development to test the enclosures before detailed design and solutions for metallic materials are completed.

Progression will be made first with PE before being transferred to these more challenging metallic materials.

Objective(s)

The work will be undertaken in four stages, the forecasted activities are expected to take around 4 months to complete as an expedited undertaking. This is subject to manufacturing and component availability, field trials timelines and key design assumptions and challenges. Each Stage will demonstrate successful development and progression.

The project will be delivered through the following outline:

Stage 1 – Concept design and concept demonstrator
This stage covers the rapid development of a concept demonstrator for the ServiSWAP encapsulation bag. The key aim is to produce an enclosure to meet the size, shape and sealing requirements of the service pipes specifications.

Stage 2 – Detailed design
This stage of the project completes further development of the rapid demonstrators to overcome specific technical challenges of the pipe classes and the connection methodologies.

Stage 3 – Manufacture, assembly and debugging
This stage of the project completes the manufacturing and assembly of five ServiSWAP systems.

Stage 4 – Testing, Trialling and refinement
This stage of the project completes laboratory and field testing of the rapid concept demonstrators and the detailed designed units.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The objectives will include:
• Development of a service enclosure
• 20mm PE and 25mm to TRL7 – available for extended trials under deviation
• Steel & Copper (3/4 &1”) TRL5/6 (with roadmap to TRL7)
• Lead (1” equivalent) TRL5/6 (with roadmap to TRL7)
• Development of pressure test equipment / process
• Testing (air simulated) to verify process interruption to pressure / flow
• Undertake trials to document and improve performance in operation

Project Partners and External Funding

Northern Gas Networks
Synthotech

Potential for New Learning

This project will generate learning relating to the ability to access a service pipe to make a connection without interrupting the customers gas supply. This has the potential to change the way that distribution works are completed in the immediate term where customers are impacted s a result of the Covid-19 global pandemic but also longer term where customers are vulnerable, and works may take place without interruption.

Dissemination will be through collaboration and a cross-GDN repex taskforce and GIGG.

Scale of Project

This project will focus on access to a service pipe to make a connection without interrupting the customers gas supply and is being delivered as a complimentary project to support the SGN led Live Service Transfer NIA project (NIA_SGN0163). The Live Service Transfer project is a collaborative, cross-GDN effort and Project ServiSWAP has been identified to feed in directly to the project group.

Project ServiSWAP is a derivative of the NGN led Project Zero and therefore will be delivered by the same project team to enable continuity of learning.

This has the potential to change the way that distribution works are completed, and the learning generated from Project Zero will ensure that this solution also enables interruption free engineering activity to access the gas service pipe and support gas mains replacement activity.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

This project will be undertaken in the NGN geographic region with collaborative input from UK GDN's.

Revenue Allowed for the RIIO Settlement

Successful completion would allow NGN to perform live service connections without entering the customers property or supply interruption supporting the gas mains replacement programme.

Indicative Total NIA Project Expenditure

External Cost = £73,800
Internal Cost = £109,104

Total Cost = £182,904

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)

It is expected that if successful this project could provide Network Licensees with an opportunity to make live service isolations without having to enter customer premises. This therefore provides safety benefits to operatives and customers during the COVID-19 situation.

Overall this project aims to support customers who may be in shielding but still required critical replacement work on their gas service.

Please provide a calculation of the expected benefits the Solution

Analysis indicates that there is a small quantitive cost benefit for this operation however the qualitative benefits are significant.

Forecasted cost benefit of £14.25 per operation for affected properties. Estimated 2000 operations per annum (14.25 x 2000 = 28,500 per annum)

Whereas the solution will also enable completion of repex activity with significant reduction of risk to network engineers and customers. This also creates a solution to enable progression with the enforced mains replacement programme to remove iron mains from risk, currently suspended.

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

The Repex programme and associated service renewals are carried across the all GB networks therefore this project is applicable to all Gas Networks.

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

The implementation cost post-completion of the project will be assessed and will be defined depending on the project outputs. The output of the project is expected to be a high TRL solution which is will be commercially available for all networks to enable completion of repex activity.

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 develop by this project is relevant to all networks as it directly relates to the tasks undertaken to renew mains and services as part of the gas mains replacement programme.

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

The project links directly to the Distribution Mains Replacement, Reliability and Maintenance and overall customer service element of the innovation strategy

☑ 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 the Smarter Networks Portal and all other Network Licensees and no other similar projects have been carried out. This project will build from the leaning generated as part of the previously completed Project Zero.

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 gas mains replacement programme requires the interruption of supply on every occasion where a customer is directly affected and also access to the property on predominantly every property. The current challenge faced by Covid-19 offers no flexibility meaning we must enter the property, disconnect the customer or not and replace the main without breaching risk assessments or government lockdown/social distancing measures. No solution exists to resolve this matter, and this is significant development and whilst this is a current challenge, at this time it is not yet know how long the impacts of Covid-19 will remain and therefore this innovation is essential

to enable the enforced mains replacement programme to resume.

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

No solution exists to resolve this matter, and this is significant development and an uncertain high-risk approach not covered by current regulatory arrangements as part of BAU.

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

This project presents specific challenges to technical and operational measures and the mechanics of assessing services pipes in a gas free environment without impacting supply are very much uncertain and a risk. The commercial factors surrounding this approach are also uncertain. The solution may prove to be technically feasible but the commercial arrangements to enable deployment must be considered and proven throughout development and demonstration. For these reasons it is appropriate that NIA funding is utilised.

This project has been approved by a senior member of staff

☑ Yes