

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

Oct 2019

Project Reference Number

NIA_WWU_058

Project Registration

Project Title

Debris In Pipe

Project Reference Number

NIA_WWU_058

Project Licensee(s)

Wales & West Utilities

Project Start

October 2019

Project Duration

1 year and 6 months

Nominated Project Contact(s)

Matthew Phillips - WWU. Wayne Smith - NGN. Stuart Sherlock - SGN. Mark Pritchard - Cadent

Project Budget

£105,200.00

Summary

A project to understand the issues faced through Debris in Pipes and conceptualise potential solutions

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

The metallic gas distribution network has a 200-year history - some of it was built in Victorian times and is still used today. Under the Iron Mains Replacement Program, GDNs are replacing the iron mains with new polyethylene pipes. Most of this replacement is carried out using live / dead insertion; the new pipe is pushed into and through the old one, avoiding the need to dig up roads. This method reduces the time that consumers are without gas and so is preferred. In addition, network operators are also increasing the use of robotics to repair, inspect and maintain the remaining metallic pipelines.

These operations can be hindered by debris (such as Dust, corrosion products, anaerobic material, and loose items) in the main. Therefore, there is a need to understand the impact of debris on these operational systems / methods. This will then allow the identification of potential solution families to minimise the effect of debris.

NGN, Cadent, SGN and WWU all share similar concerns over the presence of debris, but the key challenges are different for each of the organisations.

Method(s)

The scale of this topic is significant, and it would be easy to develop multi-year academic projects in order to provide an overview of the issues. However, this would not necessarily provide the GDNs with obviously routes to addressing debris.

Therefore, in order to move forward, a 9-month project has been developed by Steer Energy to provide the GDNs with an overview of the key issues, as well as starting to identify potential routes for improvement. The project is divided into 3 main work packs:

1. Problem Definition: Understanding the issues faced through Debris in Pipes for a range of stakeholders
2. Identify and catalogue challenges: Quantify the challenges (i.e. low, medium, high) faced by the individual components of Operational processes,
3. Solution Avenues: Determine the key areas to target potential solutions towards, with potential solution families conceptualised.

Scope

The project will be broken down into 3 main work scopes, plus a reporting phase:

WP1 Problem Definition

1. Understand current processes where debris is an issue, in relation to (i) robotic use, and (ii) dead and (iii) live insertion techniques. Reference will also be made to other operations where debris appears to create a challenge.
2. Map process and gather stakeholder views (Field Ops, Office Ops, Policy, Innovation etc) under timescales allowed
3. Define what success criteria in operations for each GDN (optimal operations)

WP2 Identify and catalogue challenges

1. Debris, Objects, Joints, Sealant, Friction, Pipe Insertion, Pipe Bends etc
2. Analyse each and define impact on 'easy installation / optimal operations'
3. Add rating for each based-on impact and quantify the challenge

WP3 Solution Avenues

1. Identify for the key impact areas the possible solution avenues to explore
2. Propose potential partners to support solution development

WP4 Reporting

1. Monthly Reporting
2. Final Report

Objective(s)

1. Obtain an overview of the challenges of Debris in pipes from a range of stakeholders within each of the GDNs.
2. Provide the GDNs with a draft methodology for the quantification of each of the challenges (such as Debris, Objects, Joints, Sealant, Friction, Pipe Insertion, Pipe Bends)
3. Create overview concept families which could be used in order to provide a solution to the challenge

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

1. Confirmation of the different perceptions and challenges faced by individual GDNs.
2. Key issues regarding debris in relation to the operations (live / dead insertion, and robotic systems) are captured
3. Key issues regarding debris in relation to the operations (live / dead insertion, and robotic systems) are rated
4. Initial concept families are proposed for addressing these key challenges

Project Partners and External Funding

This project will be led by WWU with Steer Energy, in collaboration with Cadent, SGN & NGN.

It is wholly funded via NIA.

Potential for New Learning

Potential new learnings include:

1. Cross-GDN understanding on the challenges debris poses to specific field operations, ideally both in the short term and long term.
2. A methodology for determining the degree of risk associated with the individual debris challenges

Scale of Project

The project will involve representation from the all GDN's and will be a desktop study which is the appropriate scale for the project

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project will take into account the problems associated with debris in pipe across the entire GB gas network.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

Cadent

External: £39,450

Internal: £13,150

SGN:

External £19,725

Internal: £6,575

WWU

External: £9,862.50

Internal: £3,287.50

NGN

External:£9,862.50

Internal: £3,287.50

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)

If the debris in a pipe means the insertion technique cannot be utilised, then another option is open cut. This method of laying a pipe is expensive and disruptive, it is usually only a last resort. The cost of open cutting a main can vary drastically depending on the situation, however savings would definitely be realised if we could limit the use of Open Cut.

Also robotics are fast becoming a means of method for inspection, debris in the pipe can affect how far a robot can travel. By removing debris in pipe networks would be able to realise the full benefits of robotics inspection.

Please provide a calculation of the expected benefits the Solution

Research Project

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

Part of the project is to understand the size of the problem, currently no data is captured for the networks to understand how often debris is a problem and therefore where it could be rolled-out.

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

The project will look at possible solution avenues to explore & propose potential partners to support solution development. We would not know at this current stage the cost of rollout.

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 networks will encounter the problem of debris in pipe and the issues it causes with robotics travelling through a pipe or insertion being difficult, with the potential of having to revert to open cut, which is expensive and disruptive to the customer. All networks are taking part in 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.

All networks are part of this project and have confirmed no work of this kind has been completed before.

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

Some of the issues caused by debris in pipe affects innovations that are currently being trialled by GDN's, this project will ensure that other innovation projects are not affected by a longstanding issue that hasn't been addressed or investigated by the GDN's before. If solutions are identified that minimise these issues they will be truly innovative, as currently the GDN's have very little in place to manage debris in pipe

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 project did not form part of the RII0 GD1. It requires funding outside of this. Also the scale of the problem is unknown and therefore the level of uncertainty associated with the project would be beyond the networks risk appetite.

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

Networks do not have the in-house capabilities to allow us to complete this project without the support of NIA funding. Also the use of NIA funding means learning will be shared with all networks potentially benefiting customers throughout the UK.

This project has been approved by a senior member of staff

Yes