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

Mar 2021

Project Reference Number

NIA_NGN_291

Project Registration

Project Title

Large Diameter PE Pipe Cutter

Project Reference Number

NIA_NGN_291

Project Licensee(s)

Northern Gas Networks

Project Start

March 2021

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Tom McPherson

Project Budget

£168,650.00

Summary

The proposed project is to work in partnership with Steve Vicks International to design, develop and demonstrate a safe and practical method to enable safe, efficient and reliable cutting of large diameter PE pipe with wall thickness' up to 103mm, inclusive of 630mm diameter pipes.
We propose that the cutting machine designed will operate in both below ground and above groundscenarios.
Design, manufacturing and testing will be carried out at the SVI headquarters in Bradford on Avon and a Technical Report will be completed and supplied to NGN for evaluation prior to moving into any subsequent project phases.
The finished design will be assessed by a 3rd party to ensure compliance with any relevant legislation that may affect the design and use of the cutter once completed.

Third Party Collaborators

Steve Vick International Ltd

Nominated Contact Email Address(es)

innovation@northerngas.co.uk

Problem Being Solved

Currently, cutting operations on large diameter Polyethylene (PE) pipe are notoriously difficult.
Some of the cutting techniques currently being used throughout the UK gas network are dangerous and inefficient. Across the industry, Hand-held chainsaws and similar devices have been outlawed due to injury to operators and to prevent them from being used in potentially explosive atmospheres.

Cutting large diameter PE pipe in-ground is very difficult, presents significant safety risk and is time consuming due to the physical effort required. This challenge is often exacerbated due to the fact that typical working space restrictions found in and around an

excavations can present a challenge for operatives which needs to be managed out.

Method(s)

Discovery – Initial stakeholder sessions have already taken place within Northern Gas Networks to develop scope and objectives for this project.

Design and Development – Steve Vick International will undertake this stage at their facilities in Bradford on Avon. SVI will detail all work carried out with all key milestones / decisions made in the form a log / report. This report is to be shared with NGN prior to advancing to the next phase.

Field trials – To be carried out under a G23 mandate to make sure the cutter is suitable to be used on the network. Measurement of efficiency, safety and usage will be monitored and recorded.

Project Closure – End of project phase to assess whether the cutter is viable to be produced to be used commercially.

Scope

- All design and development work from TRL 4 up to TRL 7. (NIA Funded)
- Data collection to allow project progression to TRL 8 and 9 (SVI Funded)
- A finished cutting system at TRL 8 with all additional design and refactoring work (SVI Funded) and therefor outside of NIA funded activities and will be provided at SVI's expense.
- A cutting system that can be used in and out of an excavation by a single operator.

Objective(s)

The objective of the project is to deliver:

1. Identify the best two methods for LDPE cutting
2. Identify the best single method for cutting LDPE
3. Produce the final prototype machine for use on Northern Gas Netwok's sites
4. Supply a factory ready machine to NGN (BAU or TRL 8-9)

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be deemed a success if the solution:

- Complete one full circumferential cut
- Has been demonstrated as being safe and efficient to operate
- Is suitable for usable in a potentially hazardous area/in live gas conditions.

Project Partners and External Funding

Northern Gas Networks
Steve Vick International – funding **£56,463** towards the project

Potential for New Learning

It is expected to be used across the range of pipe sizes within the gas industry but has the potential to be used in other industries, particularly water who also use PE pipe.

Scale of Project

Design, Development and Testing
The project will aim to produce a new robust, efficient, safe, ergonomic and cost-effective LDPE cutting machine that can be used easily by NGN main laying staff. It will be safe to use in both above ground and in ground scenarios allowing for minimal excavation below an existing LDPE pipe.

The design and development work along with all of the testing and design review will be captured in a Design & Development Log. This log will form half of the SVI closeout report for the LDPE Cutter project.

Field Trials

The aim of the field trial phase will be to give NGN main laying staff the opportunity to use and assess the field trial prototype machine in live conditions. SVI representatives would be on site during initial training but it is hoped that NGN staff will be able to start using the machine on their own with minimal interaction with SVI staff once trained.

Data from the field trials should be captured by NGN operatives using the standard G23 feedback forms. All sites where SVI are in attendance will be included in the SVI field trial report and form half of the closeout report. Data and feedback captured during the field trial phase will influence the final design of the system and will form all of the refactoring design work that will be considered and included in the final business as usual factory model.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

Design and development at Steve Vick International.
Field trials undertaken within Northern Gas Networks geographical area.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External Costs - £89,750
Internal Costs - £22,437
Total NIA Project Cost = £112,187

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)

Based on minimized employee and customer risk and time saving. It is calculated to have an assumed potential cost benefit of £210 per operation.

Please provide a calculation of the expected benefits the Solution

Based on assumptions of c.219 operations a year. The assumed total cost benefit would be £46,017 per annum.

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

Upon completion of this project a new piece of equipment will be available on the market for all networks who would benefit from a safer and quality assured cutting method for large diameter polyethylene pipe.

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

This is subjective, dependent on level of investment and roll out from other networks

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 will be suitable for use by all GDN's and in fact on any PE pipe on any network. The project will provide learning and demonstration on how the benefits can be enabled to deliver positive outcomes for customers.

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

This addresses distribution mains replacement, and within the innovation strategy the Optimised assets and practices area.

☑ 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.

Previous market research shows that there is currently no products on the market. Detailed review of the smarter networks portal also evidences no similar projects undertaken to date.

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

There currently is no industry standard in place for large diameter PE pipe cutting, as such this innovation and the development of this type of solution has not been tried before because it requires an industry standard to be created.

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

Due to the low TRL starting point of this project and investment risk involved, this is not a project that would be suitable to be funded via business as usual methods.

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 traditional method for cutting large diameter is a well-established operational way of working and allows all networks to operate efficiently, albeit with opportunities to improve as documented above. The move to innovate and create a suitable cutter will benefit social / environmental factors including overall time excavations are needed across the network and increased safety to the workforce and customers. Therefore, this is appropriate to fund via the NIA mechanism.

This project has been approved by a senior member of staff

☑ Yes