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

Jul 2018

Project Reference Number

NIA_SGN0129

Project Registration

Project Title

Vacuum Excavation for Local Transmission System (VELTS) - Stage 1

Project Reference Number

NIA_SGN0129

Project Licensee(s)

SGN

Project Start

June 2018

Project Duration

0 years and 10 months

Nominated Project Contact(s)

Oliver Machan, Innovation Project Manager

Project Budget

£23,538.00

Summary

This project will investigate the feasibility of developing an innovative solution to reduce costs, increase safety and improve efficiency when excavating on the Local Transmission System (LTS).

Nominated Contact Email Address(es)

sgn.innovation@sgn.co.uk

Problem Being Solved

At present, excavations over and around the LTS is both time consuming and costly. Although commercially available suction systems exist, their use in reality is restricted due to the challenging legislative and physical environment of the LTS.

The typical footprint requiring excavation for most situations is around 16m2 to a depth of 2-4m giving an extraction volume of 32-64m3. Ground types vary considerable in and between the network areas, ranging from freely draining sandy and loamy soils though raised bog peat soils to thick impermeable clayey soils and lime-rich soils over chalk or limestone. Currently this is hand dug, which is hazardous to workers, time consuming and costly.

Following a competitive tender exercise, MTS Suction Systems UK Ltd have been chosen to partner with SGN to develop a vacuum excavation system that has been proven safe to use on and around our LTS infrastructure.

Stage 1 will investigate the feasibility of developing an innovative solution to reduce costs, increase safety and improve efficiency when excavating on the Local Transmission System (LTS).

Method(s)

Stage 1 – Feasibility Study:

- Investigate the state of the art for UK-deployed VacEx equipment suitable for LTS application, using as a primary source of data and information the equipment manufactured by MTS Gmbh and sold into the UK through Mammoth-MTS.

- Performance evaluation to include, but not limited to, excavation capacity, ground type resilience, vehicle weight, traction options for rural sites, spoil management, noise abatement, suction hose design (power options, control, horizontal and vertical reach), embedded safety features (limiters, interlocks, fail-safe modes), safety performance history.
- Specific feasibility to be undertaken of the option for a separate electric drive for the fans, pumps and compressors (vehicle can retain its current diesel drive train) for improved environmental compliance.
- Review the Gas Technology Institute and MTS reports on safe application of VacEx in potentially flammable natural gas atmospheres,
- Review current operational application of VacEx on LTS assets within SGN, specifically to understand attitudes and perception of safety compliance, concerns or issues in its application in those circumstances where VacEx is a currently permitted working practice (as per SW/2), subject to permit to work authorization.
- Estimate business benefits attainable with and without further technology development as a basis for the CBA in Stage 2.
- Review and feedback session to be held with MTS and SGN at the midway point to discuss preliminary findings

Following successful completion of Stage 1 Stage 2 and 3 will look to construct, prototype and test the VELTS system, culminating in a full-scale field trial.

Scope

The scope of the project is to establish the requirements and feasibility of implementing an innovative Vacuum Excavator for Transmission that could work in the challenging rural environment of the LTS.

Objective(s)

The objective of this project is to investigate the feasibility of developing an innovative solution to provide SGN and the wider Gas Industry with an efficient and effective approach to local transmission system pipeline excavations, reducing cost and improving safety in comparison to the current ‘hand dig’ method.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be deemed successful if the following has been achieved:

- a review of the state of the art for UK-deployed VacEx equipment suitable for LTS application
- an evaluation of the current operational application of VacEx on LTS assets within SGN, specifically to understand attitudes and perception of safety compliance, concerns or issues in its application in those circumstances where VacEx is a currently permitted
- an estimate of the business benefits attainable with and without further technology development as a basis for the CBA in Stage 2

Project Partners and External Funding

Vector Business Services Ltd and MTS Suction Systems UK Ltd

Potential for New Learning

The project is expected to provide all Network Licences with a fundamental understanding of whether it is possible to introduce a cost effective and safe vacuum excavators system in the challenging legislative and geographical rural areas of the LTS.

Scale of Project

The project is a feasibility study that will investigate the benefit of the VELTS system and inform Stage 2 to further progress through the TRL’s.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The feasibility study will be undertaken at the partner offices with visits to SGN staff and locations as and when required. No field trials are planned during this stage.

Revenue Allowed for the RIIO Settlement

There are no direct saving benefits anticipated.

Indicative Total NIA Project Expenditure

The total expenditure for Stage 1 is £23,538, 90% of which (£21,184 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)

The financial benefit will be dependent on the assumed performance of the vehicle and the ability to realise savings from current labour arrangement. It is difficult to accurately quantify the actual financial benefit at this stage. As indicated by the low start TRL, the method is at an early stage of development and cost estimates will be refined as it is further developed.

Please provide a calculation of the expected benefits the Solution

N/A - feasibility study.

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

The potential outcome of this project is applicable across all GDNs

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

There are no costs associated with sharing the outputs and recommendations of this study with the other Network Licensees, which will be the first step to roll across GB.

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 learning from this project will benefit all network licensees. If the project leads to the successful development of a safer and more cost-effective solution to the issues around excavating transmission assets then other network licensees will be able to use the learning generated to embed this new solution in their businesses. This will enable cost reductions and improvements in safety.

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 aligns to the target area of repair and aims to improve the efficiency of excavation around the LTS as well as increasing the safety of the workforce.

☑ 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 Network Licensees and no other similar 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

n/a

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

n/a

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

n/a

This project has been approved by a senior member of staff

☑ Yes