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_WWU_070

Project Registration

Project Title

Zero emission odorant pumping system

Project Reference Number

NIA_WWU_070

Project Licensee(s)

Wales & West Utilities

Project Start

March 2021

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Catherine Lister

Project Budget

£241,436.00

Summary

A project to assess the suitably of electrically driven hydraulic diaphragm pumps, avoiding the need to use own use gas which is in turn vented to atmosphere.

Nominated Contact Email Address(es)

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Problem Being Solved

Natural gas is odourless so, for safety purposes, odorants are added to give it the familiar gas smell.
According to current legislation (the Gas Safety Management Regulations 1996 – GSMR, the Pipeline Safety Regulations 1996 - PSR), the presence of natural gas at 1% in air must be detected by smell.

In 1997 the UK gas network started the LGT (local gas treatment project). The project saw the installation of over 135 odorisation points throughout the UK distribution network. Since then the current systems still remain largely the same as the original installation other than some small mechanical and instrumentation upgrades.

The current system injects odorant into the pipeline by a pneumatic plunger. The system is accurate and safe, however vents a considerable about of natural gas to operate. With the current worldwide need to reduce carbon emissions due to climate change it is critical that every possible reduction in emissions is taken. This project will deliver a new electrically operated odorisation system that won't emit gas to the atmosphere, that, if successful, could be deployed on all the WWU LGT sites.

Method(s)

The project will demonstrate a change to the current system of hydraulic diaphragm pumps. The project will install a zero-emission electrically driven hydraulic diaphragm pump (Zeo NJEX) that has never been installed in the UK. The pump will stop the current

continuous release of gas and saving a substantial amount of own use gas and therefore the amount of unaccounted for gas at each of the offtakes.

A review, appraisal and approval recommendation of the concept and design for the new electrically driven hydraulic diaphragm pumps on a live site will also be conducted. The review is to ensure any proposed pump meets the requirements as set out in the WWU document T/PM/GL/5 Management Procedure For Managing New Works, Modifications And Repairs, this includes any HAZOPs, HAZIDs and the Safety Integrity Levels (SIL) allocated to the safety functions. These are necessary to ensure Wales & West Utilities' compliance with legislation, including Pressure Systems Safety Regulations (PSSR), the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR), the Electricity at Work Regulations (EWR), the Control of Major Accident Hazard Regulations (COMAH) and where applicable the WWU Safety Case and the Major Accident Prevention Document (MAPD).

Furthermore, there is also a requirement that any odorisation system must meet the functional requirements of IGEM/SR/16 Odorant systems for gas transmission and distribution.

In addition to the above reports, the project will also produce a review and report of all current WWU policies and procedures pertaining the odorisation of natural gas, to ensure the compliance of any new odorisation system and to identify any areas of the current procedures that would need updating should they not currently comply.

Scope

Quality, health, safety and environment (QHS&E):
• Perform a HAZOP meeting
• Produce RAMS for installation and commissioning

Design Mechanical:
Provide mechanical drawings for connecting new system into the current infrastructure:

- Injection point and line
- Connect odorant line from bulk tank to NJEX-zeo odorant system
- Connect new PRU to tank and ZEO
- Design drawings for small PRU
- Misc documents (manuals, data sheets, sizing calcs etc)
- Approval/appraisal of the concept and design for the new design/system to ensure they meet the requirements set out in the T/PM/GL/5. Approval and Appraisal to be carried out in the following disciplines: Electrical, Instrumentation and Mechanical. (DNV-GL)
- Produce an SR15 Safety Integrity Level (SIL) assessment on the proposed odorisation design as supplied. (DNV-GL)
- Carry out a technical review of WWU's odorisation policies and procedures and identify areas that will require updating/amending based on the requirements of the proposed new design/system.(DNV-GL)

EC&I Design:
Provide EC&I drawings for connecting new ZEO into the current infrastructure:

- New electrical connections
- New SCIM panel design
- Data cables between new SCIM and ZEO

Purchase & Delivery of Equipment

Installation & Commissioning:

- Installation and evaluation of system

Report

- Project report provided detailing any issues faced, solutions and financial review / benefits

Objective(s)

To install and assess the suitably of an electrically driven hydraulic diaphragm pumps, avoiding the need to use own use gas which is

in turn vented to atmosphere.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

A successful project will see the installation of the Zeo NJEX pump, with a detailed report on the benefits of the system, including the power requirements of the pump via electricity instead of gas. The report will also cover any issues faced during the trial.

Project Partners and External Funding

Project Partners: Westwood Technical Limited, Haskel Europe Limited and DNV GL. The project will be fully funded by the Network Innovation Allowance

Potential for New Learning

This project will allow us to evaluate if the Zeo NJEX can perform as well as the incumbent version and in doing so will reduce the amount of carbon emitted to atmosphere.

Scale of Project

The project will install one unit on the Wales & West network, under field trial conditions.

Technology Readiness at Start

TRL7 Inactive Commissioning

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Within the Wales & West Utilities network.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

External Cost: £181,077
Internal Cost: £60,359
Total: £241,436

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 new electric pumping system is a lot less complex in its design with less parts, which would improve ease of maintenance, reduce maintenance costs and cut down time and related costs from alarms, faults and callouts, especially relating to expansion tanks which would not be required with the new system.

Please provide a calculation of the expected benefits the Solution

The main driver for the project is to reduce the amount of gas that is vented to atmosphere during the project. It is estimated that 2,000 tonnes of carbon are released to atmosphere per year during this operation. Based on a non-traded carbon price of £72/tCO2E. this equates to £144k p/a

There are also benefits relating to repairs to the system. WWU had 40 callouts to attend faults caused by the expansion tank in 2020. The new system does not require expansion tanks, so costs associated with this stream of work would be eradicated.

The project report will also detail the cost associated with powering the pumps with electricity.

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

WWU have 17 Offtakes each with a working and standby pump, which is a total of 34 odorant pumps on its network. This will vary for each network but gives an indication on the size of rollout.

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

The pumps are broadly the same price as the incumbent system, so rollout costs would be no greater. Each network will have their own program of work to replace these pumps.

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 are required to follow The Gas Safety (Management) Regulations 1996 therefore the learning generated from the project will be applicable to all networks. The system has the potential to have a direct impact on the network by reducing the levels of carbon emitted to the atmosphere,

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.

No project of this kind has been completed in the UK.

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

This electric pumping system is new to the UK, it has been designed for today's environmentally focused market to reduce carbon emissions and to bring ease of use and maintenance to the field. However, the use of electrically driven pumps has never been used for this type of application, and one of the aims of this project is to find out if we are swapping risk factors in the current system for

others of equal, higher or lower risk. The pump itself has been specifically designed for the pumping of odorant and unlike our current pumps has duel diaphragm redundancy built in which is a high cause of faults and so will limit process disruptions from single or even double pump failures. Currently our pumps are set to inject the same amount of odorant in every stroke, the amount of time between strokes is then varied according to the flow through site. This new design precisely calculates pump displacement and odorant usage and interfaces with the pipeline flow signal to maintain designed odorization rate by adjusting the stroke rate of the pump. This improves the accuracy of the amount of odorant injected and gives us greater visibility and monitoring capabilities.

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 RIIO GD1. It requires funding outside of this.

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 is a brand new piece of equipment that has never been used on the gas network in Great Britain, the cost to power the new pump vs using own gas use is currently unknown, WWU need to ensure it has a positive impact both financially and environmentally before investing it the system. By utilising NIA, all findings will be shared with gas networks in the UK.

This project has been approved by a senior member of staff

☑ Yes