national gas transmission

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

Aug 2014

Project Reference Number

NIA_NGGT0059

Project Registration

Project Title

Renewable Power Trial and Demonstration

Project Reference Number

NIA_NGGT0059

Project Licensee(s)

National Gas Transmission PLC

Project Start

August 2014

Project Duration

1 year and 7 months

Nominated Project Contact(s)

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Project Budget

£299,000.00

Summary

Remote isolation valves are currently installed on the National Transmission System (NTS) at Multi-junctions, Compressor Sites and Entry Points to allow a pipeline to be isolated remotely by Gas Network Control Centre. However, there over 200 block valve sites which have local operated valves and would require staff to visit the site to operate the valves and there are 39 Exit Points where the main pipeline isolation valve can only be operated locally at the site.

The risk to the pipeline network is controlled by a number of processes and procedures to avoid damage to a pipeline; however in the event of severe damage, leak or rupture, it would be necessary to isolate and de-pressurise the affected section of the pipeline. In case of emergency the current approach would be to send staff to the block valves either side of the incident to isolate the pipeline. In the event of a major incident then the nearest remote operable valves would be used and the gas supply to the exit points between the two remote valves would be lost. This approach relies on a quick response time from staff to attend site with sufficient equipment to gain access to the valves, which is in some cases located in below ground pits requiring any accumulated water to be pumped out before the valve can be operated.

The traditional way to provide electrical power to these types of facilities is to use the local electricity company's services to provide the supply. The cost for this can be extensive and therefore prohibitive. There are alternative methods to get power to remote sites which National Grid are looking to investigate.

Where possible it is preferable to reduce the carbon footprint, the most common configuration to do this is to use PV cells and/or wind turbines with an electrical supply. Project NIA_NGGT0039, Renewable Power on Remote Installations, ascertained that it is feasible to provide the electrical power for existing or new National Grid installations from just renewable power sources, however work to date indicates there are a number of factors with a high degree of variation, including options for combined solar and wind, valve type, actuator type, site location, and season which determine whether the solution is a practicable one for the site. This work will trial and demonstrate the renewable power technology in a simulated environment.

Third Party Collaborators

Orbital Gas Systems

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

There are remote isolation valves currently installed at Multi-junctions, Compressor Sites and Entry Points across the National Transmission System which allow a pipeline to be isolated remotely by Gas Network Control Centre, however there are also over 200 block valve sites, with local operated valves which require staff to visit the site to operate the valves. There are also a number of exit points where the main pipeline isolation valve can only be operated locally at the site.

National Grid have an approved strategy for local to remote conversion at strategic block valve and exit points associated with National Grid emergency arrangements for the NTS pipeline.

This project is a follow on from NIA_NGGT0039, Renewable Power on Remote Installations. NIA_NGGT0039 was the feasibility study to investigate the use of photo voltaic (PV) cells and/or turbines as the sole source of permanent power for the installation. The results from the feasibility were promising however there is a high degree of variation in the respective technologies and hence uncertainty that the technologies available could provide the right level of power across different geographical locations and throughout all seasons. It is therefore necessary to trial and monitor an off line telemetry kiosk, valve and actuator arrangement before making the relevant investment decisions.

Method(s)

Trial and demonstration of a renewable power installation utilizing PV and/or Turbines with batteries as the permanent power source to provide the power to gas installations:

- Detailed Design
- Site Works
- Commissioning
- Post-commissioning monitoring
- Reporting

As the project went through the detailed design stage, it was established that there was an opportunity to test two different actuator types. The two types of actuators to be used within the project are an electric and an electric hydraulic actuator. There will be the ability to switch between the two actuators that the kiosk will control as to not be running both at once. This allows us to keep the testing of the equipment as real to life as possible, hence a change control has been submitted to increase project costs from £278k to £299k.

Scope

Remote isolation valves are currently installed on the National Transmission System (NTS) at Multi-junctions, Compressor Sites and Entry Points to allow a pipeline to be isolated remotely by Gas Network Control Centre. However, there over 200 block valve sites which have local operated valves and would require staff to visit the site to operate the valves and there are 39 Exit Points where the main pipeline isolation valve can only be operated locally at the site.

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Objective(s)

To demonstrate and monitor a renewable power installation in order to determine whether the available technologies are suitable as sole power sources for installations in a range of different climates.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

To prove whether or not renewable power is suitable as the sole source of power on remote isolation block valve sites.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The demonstration requires a full scale trial which will be carried out in a simulated environment at Orbital Gas Systems prior to roll out on the NTS.

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The work will take place at the Orbital Gas Systems facility.

Revenue Allowed for the RIIO Settlement

Revenue has been allowed in the RIIO settlement to convert sites from locally operated to remote. If the renewable power feasibility study proves the concept could be successful, this will lower the cost to implement the renewable power option on these sites.

Indicative Total NIA Project Expenditure

£278,000

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)

National Grid are forecasting an estimated saving of circa £20k per installation.

Please provide a calculation of the expected benefits the Solution

It is currently costing circa £43K to add a supply line for power required on site. The additional cost of the kiosk and equipment associated with the renewable power solution is estimated to be £20k. There will therefore be an estimated saving of £23K per installation. Adapting the renewable solution over traditional methods, on an estimated 100 sites over the RIIO T1 and T2 period, would generate estimated total savings of £2.3m.

There are additional benefits associated with reduced operational costs if a site utilises renewable power rather than a grid connection plus the reduced carbon footprint.

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

This method can be applied to all Block Valve sites that currently do not have power, and are required to be made remotely operable.

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

National Grid is currently estimating a predicted total volume of 39 Exit Points and 61 Block Valves throughout the RIIO-T1 and T2 periods for local to remote conversion. The conversion using renewable power will incur additional costs associated with the kiosk and renewable power equipment however savings will be generated through avoiding the need for connections to the grid.

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 generated from this project could be used across gas transmission and distribution systems to generate power on remote sites with similar load requirements.

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 project fits within the Environmental and System Operability Themes.

☑ 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.

n/a

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

- [x] Yes