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

Feb 2015

Project Reference Number

NIA_NGGD0048

Project Registration

Project Title

Examination of the relationship between leakage and operating pressure in MP systems

Project Reference Number

NIA_NGGD0048

Project Licensee(s)

Cadent

Project Start

February 2015

Project Duration

0 years and 11 months

Nominated Project Contact(s)

National Grid Gas Distribution - Sharon Harrison

Project Budget

£136,633.00

Summary

The scope of the project includes the following:

- Review of existing data: review results from testing programme carried out on LP mains in 1992 and MP mains in 1990 to assess validity of current modelling approach

- Establish theoretical leakage and pressure relationship and how this relates to current leakage rates of MP at an average pressure.

- Review laboratory tests undertaken in 1990 by Advantica (now DNV GL) to assess if covered pressure range of MP and, if necessary, undertake further laboratory tests to support theoretical modelling and undertake analysis

A report outlining the findings of modelling and tests together with the confidence factors and recommendations for adoption of analysis to calculate leakage or next steps to required to validate the findings further.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

All Gas Distribution Networks have a modeled level of leakage for Medium Pressure (MP - 75mbarg to 2000 mbarg) systems. At present, whilst we know there is a relationship between pressure and leakage from our MP distribution system, the modelling methodology is unable to calculate the pressure effect and show the benefits that reducing the pressure would have on the level of gas losses. Networks would like to identify the level of leakage on our medium pressure system and the relationship that reducing the pressure has on the total volume of leakage, which once known, would allow networks to find solutions to reducing leakage levels and in turn the impact on the environment in reduced emissions.

Method(s)

Investigate through a mixture of analytical modelling, research of other EU country methodologies and laboratory testing of analytical models to determine the leakage and pressure relationship for our Medium Pressure asset population. Includes analysis to determine the most economic and efficient statistically robust mechanism for calculating the impact of pressure reduction on leakage.

Scope

The scope of the project includes the following:

- Review of existing data: review results from testing programme carried out on LP mains in 1992 and MP mains in 1990 to assess validity of current modelling approach
- Establish theoretical leakage and pressure relationship and how this relates to current leakage rates of MP at an average pressure.
- Review laboratory tests undertaken in 1990 by Advantica (now DNV GL) to assess if covered pressure range of MP and, if necessary, undertake further laboratory tests to support theoretical modelling and undertake analysis

A report outlining the findings of modelling and tests together with the confidence factors and recommendations for adoption of analysis to calculate leakage or next steps to required to validate the findings further.

Objective(s)

To determine the leakage rate from our MP mains networks and what relationship can be demonstrated between pressure and leakage. The ambition is to prove the relationship so that networks can consider the transfer of pressure management technology to MP system when this would deliver significant customer environmental benefits.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Success of this project will be a comprehensive assessment of a methodology that demonstrates the effect of pressure on MP system leakage and an economical way to assess the current leakage from MP systems. This will be provided in a report with detailed findings and recommendations that can be carried forward for implementation.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

This phase is limited to undertaking a comprehensive assessment of the methodology and recommending how to assess the level of leakage from MP systems. This will include laboratory testing.

It is envisaged that if successful this would result in further work to establish the MP leakage levels from the systems and then potential transfer of technologies from LP system to MP systems. This may require tests on physical assets and would form part of a separate project phase on successful outcome of this analysis.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project will be undertaken in the DNV GL office, Loughborough

Revenue Allowed for the RIIO Settlement

Estimated 14/15 spend is £24m for our total Shrinkage gas requirements.

Indicative Total NIA Project Expenditure

National Grid Gas Distribution external costs £93,159

Contingency £9,316

Internal costs £34,158

£136,633 Total NIA Project Expenditure

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 current understanding of the impacts of pressure on MP systems and an initiative undertaken on our London MP system, it is expected that pressure management could reduce leakage on MP system (123 GWh) by circa 32%, i.e. 39 GWh, which equate to circa £28m benefit through the environmental incentive. Costs to transfer the technology from LP systems to MP systems would be circa £12m therefore there would be a net benefit of £14m.

Please provide a calculation of the expected benefits the Solution

Not required as TRL below 4

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

Not Applicable

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

Not Applicable

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 relationship between pressure and leakage would be applicable to all networks.

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

Reduction in network costs and significant reduction in environmental emissions

☑ 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

☑ Yes