

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

Jan 2017

Project Reference Number

NIA_NGGD0089

Project Registration

Project Title

MEG Saturation Monitoring

Project Reference Number

NIA_NGGD0089

Project Licensee(s)

Cadent

Project Start

January 2017

Project Duration

1 year and 6 months

Nominated Project Contact(s)

Quentin Bahlmann

Project Budget

£523,847.00

Summary

The scope of work for the project includes:

- Creation of MEG gas test rig including consideration of ATEX related issues when use with Natural Gas.
- Testing and adaption of sample tube and Owlstone methods on the test rig.
- Testing and comparison of the updated approaches on National Grid's gas distribution network.
- Purchasing one further Owlstone unit (to give two in total) and integrating both units into robust packaging for on-site use.
- EMC testing of updated Owlstone design if an OEM approach used to improve packaging. Report outlining work, results and recommendations.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The introduction of dry natural gas in the 1970s caused the yarn in these joints to dry out, creating leakage paths. For many years National Grid has replaced the lost moisture by operating gas conditioning plant, which injects mono-ethylene-glycol (MEG) into the gas stream at selected system source points chosen because of high levels of lead yarn joints downstream. The MEG is adsorbed by the yarn causing it to swell and re-seal the leak path.

The current method of measurement of MEG saturation levels in the system requires the taking of samples and analysis by a laboratory. This can give rise to inaccuracies and a time lag to receive results. Therefore, there is a need to review the current testing methodology and/or develop a methodology that can give immediate accurate results to enable further MEG fogging projects.

Method(s)

A test rig will be developed, built and commissioned to accurately add a known amount of MEG vapour to an air or natural gas stream

at stand-pipe flow rates. This rig will then be used to investigate, improve and validate the existing adsorption tube method and the new Owlstone based method considering the entire process from gas leaving the main to being measured. The new Owlstone based method will be packaged into a robust unit suitable for on-site use.

Scope

The scope of work for the project includes:

- Creation of MEG gas test rig including consideration of ATEX related issues when use with Natural Gas.
- Testing and adaption of sample tube and Owlstone methods on the test rig.
- Testing and comparison of the updated approaches on National Grid's gas distribution network.
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Objective(s)

The objectives of the project

- Validate the adsorption tube method including how gas flows from main to sample tube (or if too variable understand the variability).
- Look at whether adsorption tube procedures and equipment could be improved leading to improved accuracy, fewer failed results and possibly higher reported saturation levels.
- Improve the Owlstone method by creating a configuration that minimises variability, test and clean down time and by robustly packaging the unit such that it is easy to use on-site.
- Validate the Owlstone method and ensure it is well correlated to the tube method.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

- Identified improvements to the existing methodology that could be implemented and lead to improvement in results.
- Successful demonstration of Owlstone rig giving accurate MEG saturation test results.

Project Partners and External Funding

National Grid Gas Distribution - £523,847 NIA funding

The Technology Partnership – Nil external funding

DNV GL - Nil external funding

This project will be wholly NIA funded.

Potential for New Learning

Any methodology in testing MEG saturation Levels could be utilised by all GDNs.

Scale of Project

The project undertakes test on five sites which is the least amount acceptable to validate results

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The study and development work will be carried out in office in Cambridge, deployment of the test rig will be on the National Grid Distribution Network. The exact location for field trial is to be determined.

Revenue Allowed for the RIIO Settlement

There are no allowances regarding this project in the RIIO settlement.

Indicative Total NIA Project Expenditure

The total recoverable allowance will be 90% of the project costs shown below for each Licensee under the Network Innovation Allowance (NIA):

NIA expenditure will be £523,847. External - £406,347, NGGD Internal - £117,500.

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)

An improvement in MEG saturation measurement will give more accurate information on current saturation levels. This in turn will enable more effective management of saturation levels and hence, potentially give benefits in reducing leakage by efficient use of MEG and the new spray head technology in the project related to this work.

In the GD1-RIIO period we forecast emissions to be reduced by 56 GWh (3700 Tonnes of natural gas) by 2020/21 by delivering improvements to our MEG processes through implementation of improved Fogger technology. GDNs are required to procure gas lost through shrinkage, this cost is passed to the customer in the form of the transportation charge, based on latest estimations of future gas price reference costs we expect to save ~£800,000 in gas costs. The benefits expected are equivalent of the annual gas consumption of 4,480 domestic properties based on an annual consumption of 12,500kWh. The emissions reduction (in CO2 terms) is the equivalent of planting ~320,000 trees or the annual emissions of ~30,000cars

Please provide a calculation of the expected benefits the Solution

The measurement equipment itself will not give rise to a direct financial benefit, but will enable more accurate real time data to be taken in the field. This would in turn enable more effective management of MEG Foggers and hence contribute to the savings detailed above.

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

Each GDN could utilise the technology to manage the MEG saturation levels more actively and therefore reduce leakage in the system. This would be applicable to all areas of the network that are Cast Iron and hence have lead yarn joints

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

N/A

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 accurate monitoring of MEG saturation could be used by all GDNs.

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

Not applicable – this issue is not confined to NGG therefore please refer to i) above.

- 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.

This project has not been carried out by any other Gas Transmission Group or Gas Distribution Group

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