

## NIA Project Registration and PEA Document

### Date of Submission

Dec 2019

### Project Reference Number

NIA\_NGGT0157

## Project Registration

### Project Title

GQ Sample Line Assessment & Tech Watch

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NIA\_NGGT0157

### Project Licensee(s)

National Gas Transmission PLC

### Project Start

December 2019

### Project Duration

0 years and 7 months

### Nominated Project Contact(s)

Leigh Palmer

### Project Budget

£43,500.00

## Summary

Innovation assessment and technology watch of Gas Quality sample lines across the NTS

### Nominated Contact Email Address(es)

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## Problem Being Solved

The measurement of the properties of gas at the Analyser unit is only as good as the system designed to transport the gas between the pipeline and the chromat.

Issues in the designed systems can lead to a reduction in the accuracy of measurement and could potentially lead to unnecessary cessation of flow. We want to investigate the sample systems in operation to understand any flaws in their design based on the current knowledge and ensure that the answer we get from the system is appropriate.

## Method(s)

This project will be split between site visits and survey work to inspect four different types of applications, which are representative sample systems across the NTS. This will cover two types of GSMR analyser systems, an EUETS Gas PT system and an FWACV.

Phase 1 – Survey work at the required locations, following the surveys, initial reports will be written summarising the findings – 3 months.

Phase 2 – The second part of the project will be to develop a paper for industry knowledge sharing on the results. – 3 months.

## Scope

There are a fleet of gas analysers installed across the NTS for compliance with Gas Safety Management Regulation, Gas Calculation

of Thermal Energy Regulations and European Union Emission Trading Schemes.

The analysers use a sample system to take the gas from the pipeline to a chromat. The chromat then breaks down the gas into its individual components and associated software calculates the characteristics of the gas.

These properties can be measurement of energy for billing purpose e.g. Calorific Value or safety/integrity functions such as Wobbe number or HydroCarbon DewPoint.

1. Evaluation of identified system(s) during agreed duration for both sites to include:
2. Problem statement of the customer as discussed in the pre-visit
3. Document existing system
4. Walk down system, compare as-built P&ID, collect data
5. Initial observations
6. Performance of existing systems
7. Ideas for improvement
8. Roadmap for implementation

Particular focus will be on the following:

- Maintaining sample composition to ensure sample representativeness
- Review Joule Thomson (JT) effects/condensation due to pressure drops
- Adequacy of heat tracing requirements
- Sample time delay from tap to analysis
- Identify possible improvement opportunities
- Provide cost effective manufactured solutions that will improve the system and resolve current problems

## Objective(s)

To assess the design and performance of the sample systems for the analysis of natural gas by undertaking site surveys and providing summary reports to assist in planning for RIIO-T2.

## Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

## Success Criteria

A better understanding of a representative sample of gas analysers on the National Transmission System indicating any issues in the way they have been designed and built which will assist in planning for their replacement through RIIO-T2 and beyond.

## Project Partners and External Funding

Swagelok

No external funding is provided.

## Potential for New Learning

New learning includes:

- It is a requirement under GSMR that the gas we transport is within certain tolerances on composition and characteristics. Swagelok will check that the sample systems are appropriate for the task.
- It is important that the measurement we get is timely. i.e. within minutes not days, so action can be taken. The survey will assess this. Swagelok will highlight and immediate safety concerns for NG to resolve as a business as usual activity.
- Feed in to T/SP/GQ/9 (section 6.4) for specifying sample systems. This will then be used in RIIO T2 for improve the specification of our analyser systems fleet.
- Directly benefit the gas network by improving future accuracy of measurement.
- Create knowledge that can be shared across Distribution Networks for the design of their sample system e.g. NG have 22 FWACV systems but the DNs and associated biomethanes have 180 systems. Swagelok have confirmed that gas distribution networks are already interested.

## Scale of Project

Four National Transmission Sites at project outset, the learning can be applied across the NTS but also to Distribution Networks and BioMethane sites.

## Technology Readiness at Start

## Technology Readiness at End

TRL2 Invention and Research

TRL3 Proof of Concept

**Geographical Area**

National Transmission System

**Revenue Allowed for the RIIO Settlement**

N/A

**Indicative Total NIA Project Expenditure**

£43,500

## 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)

The learning will potentially improve the accuracy in measurement of HydroCarbon DewPoint for RIIO T2. This could mean that when gas is delivered into the NTS the incomers are not prevented from flowing unnecessarily. Unnecessary cessation of flow could lead to £millions of loss of revenue for incomers and then the GNCC could take commercial action to ensure continuity of supply which would drive the gas price up for consumers.

#### Please provide a calculation of the expected benefits the Solution

N/A – Research project

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

Highly replicable, as the analysers can be used on all NG sites but also approximately 200 Distribution and Biomethane sites.

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

Will be incorporated in the analyser replacement programmes in RIIO T2.

### 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 could be applied to all Distribution Network and BioMethane Analyser sample points used in the Flow Weighted Average CV process. There are 44 NG sample points and circa 200 Distribution/Bio sample points.

### 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 efficient and reliable operation of National Grid Gas Transmission's gas analyser fleet is vital for billing purposes e.g. Calorific Value and safety/integrity functions such as Wobbe number or HydroCarbon DewPoint. This study will fall within the Fit for the Future theme of NGGT's Innovation Strategy but also within the Ready for Decarbonisation category as these systems need to be prepared for a potential decarbonised energy system.

- ☒ 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.

An analysis as such described in this proposal of the National Grid Gas Transmission analyser fleet has not been completed before.

### 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

National Grid have not used infrared cameras to inspect sample systems before. We are not aware of National Grid or and Gas Distribution company using independent third party auditors to inspect sample systems.

### 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

The sample systems are in-situ and are assumed to be operating optimally as per the day they were installed and commissioned. Industry best practice and knowledge has moved on over the previous decade.

**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 NIA project has a low TRL and involves carrying out an investigation study. The project is not part of the licensees BAU activities and therefore requires funding through the NIA. This project is applicable to all the Gas Distribution and Transmission networks where the learning can be shared between the networks.

**This project has been approved by a senior member of staff**

☒ Yes