

## NIA Project Registration and PEA Document

### Date of Submission

Feb 2017

### Project Reference

NIA\_NGGD0092

## Project Registration

### Project Title

A new technical specification for future gas composition analysis equipment

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NIA\_NGGD0092

### Project Licensee(s)

National Grid Gas Distribution

### Project Start

January 2017

### Project Duration

0 years and 7 months

### Nominated Project Contact(s)

NGGDx – Andy Lewis NGN – Adam Madgett

### Project Budget

£90,000.00

## Summary

It is anticipated that the project will consist of the following project stages:

**Task 1:** HSL to collate headline research on future measurement requirements including:

- Screening exercise for possible future gas components including hydrogen;
- Possible ranges of concentrations;
- Consideration of contaminants;
- Standards and certification requirements;
- Parameters for technical specification.

**Task 2:** Full Day Technical Workshop (1) (hosted at HSL)

Attended by technical representation from NGGD, NGN (plus possible other GDN's) plus industry specialists.

Workshop Objectives

- Build a common understanding of the requirements associated with network gas composition measurement;

- Have an informed debate on future challenges;
- Engage with industry and experts to get an oversight of possible future measurement techniques and equipment under development.

#### Workshop agenda

- Current instruments and standards:
  - The current asset base;
  - Current standards and certification requirements;
  - Current software interface requirements
- Future challenges for gas measurement:
  - Future measurement challenges;
  - Bio-gas experience for gas analyser implementation.
- Possible Future Measurement Techniques and Equipment:
  - Future measurement techniques;
  - Commercially available gas analysers.

**Task 3:** Data collection stage to feed into draft technical specification:

Following the workshop HSL will contact project partners directly for their input to the technical specification. This may take the form of a series of face to face meetings or telephone calls.

**Task 4:** HSL to produce a draft of the Outline Technical Specification for discussion.

**Task 5:** Full day Technical Workshop (2) to review draft Specification (hosted at HSL):

- HSL presentation of outline technical specification;
- Peer review and comments.

**Task 6:** HSL to collate input and write final Outline Technical Specification.

#### Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

#### Problem Being Solved

As we look to increasingly decarbonise the gas grid alternative forms of low carbon gas are coming to the fore. In particular BioSNG and Hydrogen are all worthy of note. This project looks to develop a technical specification for an instrument that is capable of measuring the CV of gas which contains a high proportion of Hydrogen within it. This instrument will be necessary for the HyDeploy NIC project run between NGGD and NGN.

As well as the technical challenge of measuring hydrogen alongside a potentially ever changing composition of base gas components there are a number of other challenges that future gas composition instruments will need to address:

- Gas composition analysis instruments may become safety devices on the network and will act to control gas composition, especially hydrogen concentration, to known safe levels;
- New sources of gas may bring contaminants into the network (e.g. siloxanes in bio-methane from sewage) which may need detecting at very low concentrations (ppm);
- The number of gas composition measurement instruments may need to increase dramatically from the limited number in operation at

the moment to deal with the variable gas composition in different parts of the network;

- The additional instruments may not be needed for billing and so could perhaps have a different specification;
- New instrumentation will be required to interface with existing systems. Current PGC instruments use DANINT software to record the data and a future suitable interface to this software or any new software may be needed;
- New instruments may be able to address the maintenance issues of managing carrier gases.

## Method(s)

Before Hydrogen can be deployed commercially, several barriers must be overcome, one of which is to ensure that there is an adequate instrumentation for fiscal and safety purposes which is approved. An instrument will hopefully be trialled on a network with a high content of hydrogen as part of NGGD and NGNs HyDeploy NIC project which will take place at Keele University in Staffordshire.

To create a technical specification for a future gas analysis instrument the technologies currently exist needs to be understood and this will be predominately achieved by a literature review. When developing the specification a clear understanding needs to be obtained from the GDNs and other relevant key stakeholders about the requirements that need met by this new instrument. Once all this information has been assimilated a technical specification can be drafted for dissemination. This draft technical specification must be agreed upon by all the GDNs before it is finalised for release to the market.

## Scope

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Attended by technical representation from NGGD, NGN (plus possible other GDN's) plus industry specialists.

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## Objective(s)

This objective of this project is identify and characterise these future challenges in more detail and produce an Outline Technical Specification for gas composition analysis equipment operating with a proportion of hydrogen that may be needed on the future gas network.

The specification will address such issues as:

Possible future gas components including hydrogen and consideration of contaminants;

Supply pressure and flow rate parameters;

Speed of response requirements;

Required accuracy;

Likely future number and location of instruments;

Required data and software interfaces;

Expected environmental operating conditions;

Requirements for safety performance (both Atex rating and safety critical control);

Expected power requirements;

Cost expectations;

Operational requirements and constraints, failure modes and spares.

The intention is that this technical specification can then be shared with industry to identify suitable equipment that is available for use on the network in the future and can be tested on demonstration projects such as HyDeploy. If such instrumentation does not exist then the technical specification is intended to stimulate development of such instruments through academic bodies such as NPL or commercial organisations.

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

n/a

### Success Criteria

Completion of the task outlined above should produce an Outline Technical Specification of an instrument that will meet the future challenges of a gas supply system sourced from multiple supplies. The specification may be met by currently available instruments or it may be a blueprint for a new instrument from the analyser manufacturers. A major indication of success for this project will be an endorsement of the specification from all the potential users. In summary the key indicators of success are:

- 1) An Outline Technical Specification
- 2) An endorsement from all the GDNs.

### Project Partners and External Funding

n/a

### Potential for New Learning

n/a

### Scale of Project

This project is done at the relevant scale which is a desk top study. The output of this study may inform a further project in developing an instrument if a suitable instrument has not been identified at the end of the tendering process from the technical specification developed during this project.

### Technology Readiness at Start

TRL3 Proof of Concept

### Technology Readiness at End

TRL4 Bench Scale Research

### Geographical Area

This is a desktop study although its implications will be UK wide.

### Revenue Allowed for the RIIO Settlement

**Not Applicable**

### Indicative Total NIA Project Expenditure

#### NGGD Costs

45k External

£11,250k Internal Cost

#### NGN Costs

45k External

£11,250k Internal Costs

## 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)

NA – no cost saving will be influenced as an outcome of this project.

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

This project will enable the rollout of a hydrogen blend in the UK gas network. Hydrogen has the potential to save the gas consumer £8bn by 2050 compared to other routes of decarbonisation.

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

NA – There will be no implementation.

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

NA – There will be no implementation.

### 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**

n/a

**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 will enable the development of hydrogen in the gas network which will decarbonise the gas network and help the UK to meet its Climate Change targets by 2050.

- 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