

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

Sep 2014

### Project Reference Number

NIA\_NGGD0039

## Project Registration

### Project Title

Siloxane Impact Study

### Project Reference Number

NIA\_NGGD0039

### Project Licensee(s)

Cadent

### Project Start

October 2014

### Project Duration

2 years and 8 months

### Nominated Project Contact(s)

National Grid Gas Distribution – Sharon Harrison, Scotia Gas Networks – Stephen Tomlinson, Northern Gas Networks – Keith Warburton, DNVGL – Martin Brown

### Project Budget

£353,495.00

## Summary

The Project will run in four phases:

- Development of the test program
  - Select appliances, critical areas to be observed
- Preparation of the two test rigs and pre examination of the appliances.
- Experiments on selected appliance
- Analysis of the impact of silica deposition on appliance performance during the appliance lifetime

### Nominated Contact Email Address(es)

Innovation@cadentgas.com

## Problem Being Solved

All gas in the UK gas network must comply with the Gas Safety (Management) Regulations (GS(M)R), Schedule 3 with regard to gas quality. GS(M)R Schedule 3 states that natural gas transported in a network "shall not contain solid or liquid material which may interfere with the integrity or operation of pipes or any gas appliance (within the meaning of regulation 2(1) of the 1994 Regulations) which a consumer could reasonably be expected to operate". One such material that may be present in raw biogas and thus upgraded biomethane but is not present in natural gas is silicon compounds (siloxanes and silanes) that will form silicon dioxide or trioxide during combustion. The Energy Networks Association has recommended that a UK siloxane limit be set and has instigated this study to quantify the impact of different siloxane levels on a range of appliances.

## Method(s)

An experimental programme will be designed to carry out tests on selected appliances. The experiments will be carried out by saturating a natural gas flow with Siloxanes using a gas bubbler construction. The effect of the Siloxanes will be measured, the results analysed and report finalized.

## Scope

The Project will run in four phases:

- Development of the test program
  - Select appliances, critical areas to be observed
- Preparation of the two test rigs and pre examination of the appliances.
- Experiments on selected appliance
- Analysis of the impact of silica deposition on appliance performance during the appliance lifetime

## Objective(s)

This project aims to provide a hierarchy of impacts of silicon compounds on the performance of domestic appliances, from nuisance affects to potential impairment of safe operation over the lifetime of the domestic appliance (~15-20 years). The project outcomes will also enable us to set an acceptable limit of siloxanes in the biomethane injected into our gas distribution networks.

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

n/a

## Success Criteria

- Acceptance of experimental programme by ENA members and appliance manufacturers
- Acceptance of results of experiments on selected appliances by project group
- Acceptance of analysis of results by the project group members

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

## Scale of Project

The project is limited to laboratory testing, funds include the use of a second test rig for testing up to 4 appliances.

## Technology Readiness at Start

TRL2 Invention and Research

## Technology Readiness at End

TRL3 Proof of Concept

## Geographical Area

The research is being undertaken by DNV GL (Netherlands). Meetings will take place in the UK.

## Revenue Allowed for the RIIO Settlement

Not applicable

## 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):

National Grid Gas Distribution - Total External Expenditure £152,037, Total Internal Expenditure £50,679

Scotia Gas Networks - Total External Expenditure £75,390, Total Internal Expenditure £25,130

Northern Gas Networks - Total External Expenditure £37,695, Total Internal Expenditure £12,565

(inc. Total External Supplier - £251,300)

Total Indicative Expenditure - £353,495

## 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)

As this is a research project, a full cost estimate is not required. The project will ensure that the gas has no deleterious effects on the customers' gas appliances.

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

Not required as TRL 3

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

Not required as TRL 3

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

No roll out costs, used to inform other projects which will have their own associated roll out costs.

### 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 use of unconventional gases, including biogas, is being investigated by all networks, and this project will enable the networks to inject unconventional gases into the distribution network without breaching the GS(M)R.

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

Unconventional Supplies – open up the use of the network to alternative energy supplies.

- 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