

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\_NGGD0040

## Project Registration

### Project Title

Introduction of 19 Bar PE Pipeline in the UK Gas Network

### Project Reference Number

NIA\_NGGD0040

### Project Licensee(s)

Cadent

### Project Start

September 2014

### Project Duration

5 years and 9 months

### Nominated Project Contact(s)

National Grid Gas Distribution – Sharon Harrison, CNG Services – Roy Taylor, Macaw Engineering Ltd – David Smart

### Project Budget

£2,112,839.00

## Summary

The scope of work includes:

- Design and install a 1.4km 19 bar pipeline
- Establish construction methods including jointing, pressure testing & commissioning.
- Establish training requirements for all aspects of the installation e.g. jointing
- Confirm HSE acceptability
- Identify and manage risks
- Establish actual benefits, in particular capex and opex
- Compile report for dissemination of findings to the wider industry
- Establish way forward to allow 19 bar PE to be implemented safely and efficiently in UK

### Nominated Contact Email Address(es)

Innovation@cadentgas.com

## Problem Being Solved

At present, appropriate grade steel is the only approved material for transportation of Gas at pressures >7 Bar The installation of a steel pipeline can be expensive due to excavation and reinstatement, jointing, connection completion timeline and on-going whole life maintenance costs. In addition, there is the unquantifiable disruption & environmental impact of laying steel pipelines by open cut

techniques and safety issues associated with welding. The use of a Reinforced Thermoplastic Pipe (RTP) instead of steel would greatly enhance the speed of a typical connection from a bio methane plant to the LTS network as it is produced in continuous lengths of up to 150m and is compatible with No-dig techniques.

## Method(s)

A 19 bar 1.4km PE gas pipeline will be installed and trialed from a bio methane plant at Raynham Farm, near Fakenham, to an injection point on the 4" NB steel East Dereham - Wells Local Transmission System (LTS) pipeline.

## Scope

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- Confirm HSE acceptability
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## Objective(s)

- To demonstrate fitness for intended purpose of the RTP material in order to make a 19 Bar connection
- To demonstrate the productivity benefit that can be gleaned from deploying this material c/w steel
- Confirm the effectiveness of No-dig techniques
- Estimate the whole life costs and hence reduction in costs compared with steel

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

n/a

## Success Criteria

- The installation of the 19 bar PE pipeline is completed, and a conclusion can be made on its potential effectiveness in the UK network.
- The use of the material demonstrates an installation cost benefit compared with steel

## Project Partners and External Funding

National Grid Gas Distribution

CNG Services

Macaw Engineering Ltd

## Potential for New Learning

This will be the first use of 19 bar PE for LTS connections in the UK, the objective is to learn if its wider use in the network would be effective.

This is an innovative use of the new material with the potential to reduce installed/whole life costs.

There are 3 market sectors that will benefit from the 19 bar option:

- Bio methane projects which are often 1 – 2 km from LTS but connection costs using steel pipelines are prohibitive
- Shale gas gathering systems which are expected to be required as shale developments move forward
- Pipelines to connect CNG stations to the LTS (NGG has identified that most major UK Distribution Centres are within 2 km of the LTS, reducing the cost to get 19 bar pressure is attractive as use of 19 bar inlet pressure gives 80% reduction in electricity requirements for compression compared to medium pressure grid)

## Scale of Project

The project is the installation of 1.4km of pipeline in an operational environment to demonstrate the benefits of PE pipe.

## Technology Readiness at Start

TRL5 Pilot Scale

## Technology Readiness at End

TRL8 Active Commissioning

## Geographical Area

The installation of the pipeline will be undertaken at Raynham, Norfolk.

## Revenue Allowed for the RIIO Settlement

There is a requirement for 80 connections over the 8 year period. It is anticipated that 20 of these could benefit from utilising HexelOne PE Pipeline. The financial benefit of this is estimated to be £2,400,00 (20 No x 1.5kM x £80).

## Indicative Total NIA Project Expenditure

National Grid Internal Costs £447,035

External Costs £1,604,799

Contingency £61,005

Total Indicative Expenditure £2,112,839

## 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 potential benefit could be of the order of £80/m compared with steel installed by open cut equating to a benefit of approx. 120K on this project. Assuming at least 10 such connections were completed per annum, it is envisaged, the benefit could be £1.2m per annum.

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

On a connection 1.5km long the reduction in installation cost compared with steel would be £120,000. If there were 10 connections per annum this would give a total saving of £1.2m per annum.

The whole life cost savings are to be evaluated as part of the project.

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

The PE pipe technology could be used across the network. Specific applications could be bio methane, shale gas gathering systems and connecting CNG stations to the LTs.

The costs for roll out be a net saving of £80 per metre compared with steel.

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

The costs for roll out would be a net saving of £80 per metre compared with steel.

### 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

RIO-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 19 bar technology could be used across the UK

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

N/A

- 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 is the first application of this technology in the UK, and has been discussed with all other GDNs.

**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**

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**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**

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

Yes