

## NIA Project Registration and PEA Document

### Date of Submission

Jan 2018

### Project Reference Number

NIA\_NGGT0120

## Project Registration

### Project Title

European Pipeline Research Group 2017

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NIA\_NGGT0120

### Project Licensee(s)

National Gas Transmission PLC

### Project Start

April 2017

### Project Duration

1 year and 1 month

### Nominated Project Contact(s)

Rob Bood, NGGT - Box.GT.Innovation@nationalgrid.com;  
Luke Hollis, Cadent Gas -  
Box.GD.Innovation@cadentgas.com

### Project Budget

£60,250.00

## Summary

EPRG (European Pipeline Research Group) undertakes a wide range of research directed to increased integrity and safety of gas transmission pipelines. Corrosion, fit-for-purpose assessment and rehabilitation will constitute the major topics for existing pipelines, whereas for new pipelines in the ever-expanding European gas transmission grid, higher strength steels and higher hoop stress factors provide new challenges and opportunities for cost-effective pipeline construction and operation.

### Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

## Problem Being Solved

EPRG (European Pipeline Research Group) undertakes a wide range of research directed to increased integrity and safety of gas transmission pipelines. Corrosion, fit-for-purpose assessment and rehabilitation will constitute the major topics for existing pipelines, whereas for new pipelines in the ever-expanding European gas transmission grid, higher strength steels and higher hoop stress factors provide new challenges and opportunities for cost-effective pipeline construction and operation.

## Method(s)

The EPRG mission is to use the combined expertise of gas transmission and pipe manufacturing companies to address common issues concerning the technical integrity of gas transmission pipelines in the fields of pipe manufacturing, pipeline design, construction, operation and maintenance. To achieve this EPRG will:

- Identify methods and practices for improving the integrity of existing and new pipelines and protecting health, safety and the environment.
- Establish research programmes in response to the needs and priorities of the member companies using the services of contractors

which are "best-in-class" in the relevant areas of expertise.

- Develop recommendations and guidelines based on the results obtained. Promote the acceptance and implementation of the recommendations and the guidelines.

The research work conducted by EPRG is established by the Plenary Group and managed by three Technical Committees, "Corrosion", "Design" and "Materials". The exchange of experience among the member companies and with other relevant institutions is an important feature of the EPRG activities. There is, for example, a regular exchange of research results with the Pipeline Research Council International (PRCI) at Joint PRCI/EPRG Biennial Meetings. There are 18 relevant projects underway at EPRG as follows:

### **EPRG Project Code - Project Title**

- 155\* – Assessment of delayed failure under constant pressure.
- 166\* – Low bond line toughness in HFW pipe.
- 171 – Influence of system parameters on crack initiation in the West Jefferson test.
- 172\* – DWTT inverse fracture II.
- 174\* – Environmental effects on mechanical damage - stage 3.
- 176 – ISO 15156 Activities on HIC testing.
- 180\* – Determination of chemical composition by mobile optical emission spectroscopy.
- 183 – SCC qualification – Full ring versus four point bend test.
- 184\* – Time dependent behaviour – full scale testing.
- 186\* – Development of a model for pipeline mechanical damage.
- 163a\* – Long term resistance to adhesion loss of 3 layer polyolefin coatings.
- 185\* – EPRG projects library.
- 187 – Strain based design assessment for stress based design pipelines.
- 188 – Assessment of mitre welds.
- 189 – Steel properties of old pipelines.
- 190\* – Follow up round robin test – HFW bond line testing.
- 184\* – Analysis of results of six time dependent burst tests.
- 192 – Revision of the EPRG guidelines for crack arrest.

*Projects of particular interest to National Grid and Cadent are identifiable by the asterisk (\*).*

It is anticipated that several new projects will be initiated during the year.

### **Scope**

Participation in EPRG gives National Grid and Cadent access to research projects that may otherwise be more difficult to fund on an individual basis, as well as the opportunity of validating work carried out on internal programmes. There are extensive networking opportunities with other gas transporters and across the wider industry. Collaboration through this organisation will continue to play a key role in the innovation portfolio.

### **Objective(s)**

National Grid and Cadent want to establish best practice technologies and techniques to allow safe, reliable, efficient and economic use of the gas network with a reducing impact on the environment. By participating in EPRG, National Grid and Cadent have and will continue to benefit from the international experience of the other member companies' representatives, while benefiting from significant leverage on project activity from the other member companies.

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

n/a

### **Success Criteria**

National Grid and Cadent assess the collaboration through individual projects against the ability to develop improvements to how we build, manage and operate the networks. Success is also determined by the level of influence we exert on each research programme and the financial leverage available compared to self funding the research.

### **Project Partners and External Funding**

n/a

### **Potential for New Learning**

n/a

### **Scale of Project**

Projects are varied in scale, from small surveys and desk based studies to full scale destruction testing. The key benefit of EPRG is the opportunity to use the leverage of the multi-party programmes to execute full scale tests, using the knowledge, equipment and assets of other operators to validate models in a way that would not be possible through a project funded purely by one business.

## Technology Readiness at Start

TRL2 Invention and Research

## Technology Readiness at End

TRL4 Bench Scale Research

## Geographical Area

The results from this project will be applicable across gas networks throughout the world.

## Revenue Allowed for the RIIO Settlement

None

## Indicative Total NIA Project Expenditure

Annual NIA spend – £60,250

National Grid Gas Transmission – £43,750

Cadent Gas – £16,500

## 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 benefits of participating in these European leveraged projects enable National Grid and Cadent to develop and implement best practice for a fraction of the full cost. Examples of completed projects include: State of the art review on pipeline resistance to earthquakes has raised awareness and understanding for future construction projects. Many of the projects of particular interest are on-going, i.e. delayed failure under constant pressure, performance of 3-layer PE coatings, the assessment of bending wrinkles, low bond line toughness girth weld defect acceptance criteria and the mechanical damage dent-gouge model.

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

Research therefore N/A

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

Knowledge from participation in the various international innovation programmes is applicable across the gas transmission and distribution networks, for example research on pipeline materials and third party damage.

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

This is completely dependent on the project specific details but is likely to be less than £100,000 as in many cases results may be used to improve the knowledge base and avoid unnecessary future expenditures.

### 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

Learning will be used to direct future developments into the most promising areas and where applicable update policies and standards. This will allow the research results generated to be applied to our network. Knowledge from this project will address many areas identified in the Innovation Strategy including safety, reliability, environment and strategic issues.

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

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