

## NIA Project Registration and PEA Document

### Date of Submission

Jan 2014

### Project Reference Number

NIA\_NGGT0005

## Project Registration

### Project Title

European Pipeline Research Group (EPRG)

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NIA\_NGGT0005

### Project Licensee(s)

National Gas Transmission PLC

### Project Start

April 2013

### Project Duration

1 year and 1 month

### Nominated Project Contact(s)

Robert Bood, Robert Owen,  
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### Project Budget

£56,000.00

## Summary

Participation in EPRG gives National Grid Gas 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.

## Third Party Collaborators

European Pipeline Research Group (EPRG)

## 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.

Projects currently underway at EPRG are as follows:

Corrosion 149 - HIC Assessment of low alloy steel line pipe for sour service application - £90k

Corrosion 150 - HIC Assessment of low alloy steel line pipe for sour service application - £150k

Corrosion 151\* - Assessment of sensitivity to hostile environments of damaged pipe, under cathodic protection and internal pressure - £167k

Corrosion 154 - Survey of sulphide stress cracking testing methodologies - £15k

Corrosion 163\* - Long term resistance to adhesion loss of 3-layer polyolefin coatings -£74k

Design 143\* - Extension of FFP and puncture resistance criteria to X80 - £110k

Design 147a\* - Development of an improved model for the burst strength of dent-gouge damage under sustained internal pressure loading (Phase 2, part 1) -£83k

Design 147b\* - Development of an improved model for the burst strength of dent-gouge damage under sustained internal pressure loading (Phase 2, part 2) -£102k

Design 162\* - Revision of EPRG weld defect guidelines -£20k

Design 164\* - Assessment of bending wrinkles (Phase 2) -£50k

Design 165\* - State of the art review - pipeline resistance to earthquakes - £17k

Design 169\* - Monitoring of buried pipelines in areas subjected to ground movement – £20k

Materials 137\* - Assessment of delayed failure under constant pressure - £70k

Materials 146 - Development of a reliable model for evaluating the ductile fracture propagation resistance for high grade steel pipelines - £110k

Materials 155\* - Assessment of delayed failure under constant pressure (collaborative with EPRG & APIA) -£82k

Materials 157\* - DWTT for small-diameter thick-walled pipe (seamless) - £65k

Materials 158\* - DWTT for small-diameter thick-walled pipe (inverse fracture) - £142k

Materials 160 - Pipelines transporting anthropogenic CO<sub>2</sub> (fracture control and corrosion) -£300k

Materials 161 - CO<sub>2</sub> pipelines – Shock tube testing (collaborative with APAI & PRCI) -£49k

Materials 166\* - The effect of toughness on the integrity of HFI pipe seam welds -£145k

Materials 167 /168\*- Revising EPRG recommendations for crack arrest toughness for high strength steels -£56k

Projects of particular interest to National Grid are identifiable by the asterisk (\*). Detailed information on these projects is presented as supplemental information, 'EPRG project information'.

## Scope

Participation in EPRG gives National Grid Gas 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 wants 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 has 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 assesses the collaboration through individual projects against the ability to develop improvements to how we build, manage and operate the network. Success is also determined by the level of influence we can 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 testing to destruction. The key benefit of EPRG is the opportunity to use the leverage of 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 - £56,000 of which

National Grid Gas Transmission - £28,000

National Grid Gas Distribution - £28,000

## 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 to develop and implement best practice for a fraction of the full cost. Examples of completed projects include:

Guidance for mechanised gas metal arc welding (GMAW)– provided best practice guidance for mechanised GMAW using the recommendations and technical know-how from the EPRG members. The report was presented as a paper at a Joint Technical Meeting with other operators in 2013.

The definition of a rich gas with respect to the arrest toughness for linepipe steel – Provided clear definition of a rich gas (and so it follows a lean gas), which allows the user to align their gas composition with the EPRG recommendations for predicting Crack Arrest Toughness for high strength pipes.

More details on benefits are described within the attachment "EPRG Project Detail"

#### 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 network, 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 dependant of the project specific details but is likely to be less than £100,000 as in many cases results may be used to update policy, standards and specifications in order to reflect best practice. Alternatively results may simply improve the knowledge base and avoid unnecessary future expenditure.

### 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. Project results, where applicable are used to update policies and standards, whether UK, European or world wide across the pipeline industry. This will allow the research results generated to be applied to our network.

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

Knowledge from this project will address many areas identified in the Innovation Strategy including safety, reliability, environment and strategic issues.

- 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