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

May 2016

Project Reference Number

NIA_NGGT0094

Project Registration

Project Title

Gas Quality 2020

Project Reference Number

NIA_NGGT0094

Project Licensee(s)

National Gas Transmission PLC

Project Start

August 2016

Project Duration

1 year and 2 months

Nominated Project Contact(s)

John Harris (Project Manager) , Robyn Jenkins (Stakeholder lead contact) , box.GT.innovation@nationalgrid.com

Project Budget

£296,200.00

Summary

It is predicted that the future shift of gas supply sources will drive the requirement to reconsider the basis of the current GS(M)R specifications so that the UK gas market is able to operate efficiently and continue to attract these alternative sources of supply. In addition there are a number of other factors that make a review of the GS(M)R prudent at this time being:-

European gas quality harmonisation.

The European Commission has asked ENTSOG (European Network of Transmission System Operators for Gas) to develop a draft amendment, following a detailed impact assessment, to the EU Network Code on interoperability to codify the CEN standard EN 16726 (Gas Infrastructure – Quality of Natural Gas – Group H.) by the end of June 2017. At present the standard does not include a Wobbe Index component but there are detailed differences in other areas from the current GS(M)R specification.

The European Commission is continuing the process over the next few years of finding a consensus on the Wobbe Index range for the next version of the CEN standard. One key option for this is the adoption of the EASEE “H-gas” Wobbe range

UK Wobbe Range

Currently the UK Wobbe range is narrower than in most other EU gas markets. Maintaining this narrower range could affect the attractiveness of the UK market to upstream parties if such parties would incur additional gas processing costs for entry into the UK compared to other markets.

Third Party Collaborators

DNV

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

The UK gas quality specification has been defined in the Gas Safety (Management) Regulations (GS(M)R). This definition dates back to 1996 and is to some extent reflective of the gas available to GB market at that time. By the end of the 2020s, gas supplies available to the UK market will have largely switched from UKCS production to other sources of gas (LNG, shale, bio-gas etc.). This predicted shift of supply sources necessitates the reconsideration of the basis of the current GS(M)R specifications so that the UK gas market is able to continue to operate efficiently, attract and utilise these alternative sources of supply whilst at the same time providing a safe and affordable energy supply to consumers. Without such reconsideration there is a risk that consumers will pay the price of "over-processing" the new gas supplies or of locking out such supplies from the UK market. The risks and impacts to National Transmission System (NTS) asset capability therefore need to be identified, qualified and quantified in terms of likelihood and scale of impact.

Method(s)

National Grid Gas Transmission (NGGT) is endeavouring to understand the likely impact of different gas specifications on existing and future NTS assets and operations. The gas quality specification for the assessment will use, as a central case, the limits of the three gas quality specifications: GS(M)R, CEN standard and EASEE 'H' gas standard with a 5% tolerance to the upper and lower limits.

> The compositions of gas that will be used for analysis will be derived from standard analytical techniques that consider limits from the specifications selected and knowledge on compositional ranges available.

NGGT will conduct three linked phases of work:-

Phase 1 – Identification of Equipment, Processes and Operations with Potential Impact.

This phase will concentrate on the identification of assets, processes and operations that may be impacted by a change in the specification of UK gas quality in respect to all NTS assets such as, but not limited to:-

> Those using gas as a fuel for operation.
>
> Those accountable for emissions (European Union Emission Trading System (EU ETS), Industrial Emissions Directive (IED) & Carbon Budgets).
>
> Those accountable for compositional or flow measurement e.g. gas analysers, primary and secondary meter assets.
>
> The key monitoring systems e.g. ALERT.
>
> Those where a safety consideration (application of standards) has been made on compositional data e.g. asset integrity performance.
>
> The impact on NGGT and associated Industry specifications and standards.

The output will be in the form of a technical report which will present the findings aligned to the above criteria. The report will identify any relevant areas that require further investigation (as part of a separate Phase 3) as well as equipment, processes or operations that will not be impacted by compositional specification changes. The report will also provide the range of gases that the NTS can accommodate with no material or economic impact.

Phase 2 – Assessment on Equipment with Known Impacts

This phase will concentrate on an assessment to qualify and quantify the risk and impact on specific performance of key NTS asset types that will be impacted by a change in specification including those that:

- Environmental
- ◦ are subject to emissions regulations (EU ETS, IED and Carbon budgets).
- ◦ Relate to Carbon Emission Factors.
- Impact on Asset Availability
- ◦ Utilise natural gas as a fuel for normal operation.

- Relate to pipeline integrity.

Where an adverse impact is identified, the risk will be quantified and where remedial action is possible, an estimation of outline costs will be provided. For emissions, the cost of remedial action will focus on those assets selected on highest risk and priority as advised by NGGT.

Phase 3 – Equipment Identified in Phase 1 Requiring Assessment. (Future Submission)

As some equipment impacts will only be identified as an output from Phase 1, this phase will concentrate on qualifying and quantifying the risk and impact on the resultant output from the earlier work. There will be a separate submission when the content of this phase is known.

Change Control 1

Following the completion of Phase 1 of the programme, it has been concluded that the following highlighted areas in Phase 3 require further investigation. Each subject area and the scope within each is presented below.

NG and IGEM (NG USED) Specifications:-

- Undertake a more detailed review of the IGEM standards and NG documents.
- Prioritise the documents to identify those for which the impact is expected to be most significant.
- Undertake scoping calculations.
- Impact assessment of the results of the scoping calculations.

Gas detectors:-

- Investigating the operational range of installed flammable gas detectors including 1 site visit if required.
- Compile list of installed equipment, operational range and method of calibration.
- Highlight those systems that might be compromised by increase in Wobbe Index of transported gases.

Pipeline Fracture Propagation:- ?

- Review fracture resistance requirements for all pipeline groups across the network.
- Develop screening approach for pipeline QRAs.
- Define remedial measure options for different risk levels.
- Prepare a costing of remedial measures to manage societal and business risks.

The work in Phase 3 will provide a comprehensive overview of all the major issues related to the changes in gas quality and the impact on the National Transmission System (NTS).

Scope

It is predicted that the future shift of gas supply sources will drive the requirement to reconsider the basis of the current GS(M)R specifications so that the UK gas market is able to operate efficiently and continue to attract these alternative sources of supply. In addition there are a number of other factors that make a review of the GS(M)R prudent at this time being:-

European gas quality harmonisation.

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UK Wobbe Range

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Objective(s)

The project seeks to deliver an assessment of the likely impacts of legislative or supply changes on gas quality and the downstream impacts on the National Transmission System. This will include a concise review and explanation of where an impact is anticipated, a detailed study when an impact is not known and an assessment of the impacts with required mitigating options, including time and cost. The report will also provide the range of gases that the NTS can accommodate with no material or economic impact. This information will provide the foundation of NGGT's ongoing gas quality management ensuring an effective and efficient management of the network for all stakeholders.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The output of the programme will provide an assessment of equipment, processes and specifications that would be impacted if a change to gas quality specification is required to meet a maximum / minimum limit from across the selected specifications of GS(M)R, CEN and EASEE 'H' Gas. The assessment must provide sufficient information that NGGT will be able to communicate to an external audience a clear understanding of the type of NTS assets impacted by a widening of the Wobbe within UK and an estimate of the further work required and options available to mitigate the risks identified. This further work, if required, will be accompanied by associated estimates of the costs and timescale to achieve this work as necessary.

This evaluation could then be used as a common process baseline for the NTS assets from which any future changes in gas quality can be related.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project will be a desktop review of the NTS issues related to widening the current GB gas quality specification.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project will only be examining the NTS asset base.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

Total programme cost: £296.2k to include work in Phase 3 as defined above. Additonal scope and costs presented in Change Control of the Method(s) section above.

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)

In the future, the current GB specification is likely to result in increases to the current gas processing costs for gas entering the GB network. The magnitude of these costs are unknown but have been estimated to be in the region of £350m/annum. Widening the current gas quality specification could remove some or all of this additional requirement for gas processing with such reduced costs passed on to gas consumers.

Please provide a calculation of the expected benefits the Solution

This is a research project that will provide valuable background information related to the EU gas harmonisation.

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

The project output will be applicable to the equipment, processes and operations of the NTS.

The project results will be of interest to all stakeholders in the UK gas chain and to CEN who are progressing the harmonisation of Wobbe Index at an EU level.

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

It is currently not possible to estimate what roll out costs will be. This will be better understood as the project progresses and the scope of any asset impact has been evaluated.

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 potential risks and benefits of widening the GB gas quality specification are uncertain, both in relation to gas utilisation and the impact on assets used to transport the gas. However, the requirements necessary to transport a wider range of gases will provide the knowledge for supporting greater flexibility in the supply of gas thus strengthening the security of supply. This project will provide a strong basis and understanding of the key asset integrity issues that will need to be considered by NGGT if a change to gas specifications is to be implemented but will also provide a valuable insight to all downstream parties connected to the network or responsible for onward transportation of gas in high-pressure networks.

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