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

Feb 2015

Project Reference Number

NIA_NGGD0051

Project Registration

Project Title

Review of the FWACV Billing Regime

Project Reference Number

NIA_NGGD0051

Project Licensee(s)

Cadent

Project Start

February 2015

Project Duration

1 year and 5 months

Nominated Project Contact(s)

National Grid Gas Distribution – S Harrison, Northern Gas Networks – B Hanley

Project Budget

£218,230.00

Summary

The following scope will be undertaken:

- Define and confirm the commercial and accessibility drivers for NGGD, NGGT and gas suppliers.
- Establish the constraints of any billing system; these may be regulatory, commercial, legal, technical or related to demand and storage.
- Define the different sources of gas and how each may impact on the billing regime – this includes future supplies such as hydrogen injection, shale gas, coal-bed methane, storage and peak shaving and bio-methane.
- Consider other NIC projects that may impact on billing – for example, the extension of GS(M)R to include unballasted .
- Look at billing solutions in other countries operating regulated gas networks to establish and benchmark best practice.
- Establish whether it is possible to exempt a certain total volume from small suppliers from the FWACV billing process (that is, determine the total amount of low or high CV gas that impacts on the stakeholders). Use different scenarios to establish which combinations of network design, flows and CVs have no impact on end users and those which have a significant negative or positive impact. Engage with Ofgem.
- Review the factors affecting the delivery of gas to an end user – location on network, variation in demand affecting source of supply, summer-winter governor settings, gas storage use, HP Distribution system operation and interaction with NTS etc. and evaluate various options for locations of CV measurement systems.
- Use existing network models of real NGGD systems (with permission those previously used under IFI) or generate generic network models to establish where extra measurements may be required to maximise the benefits to all stakeholders. This modelling could include all pressure tiers within NGGD (LP to HP Distribution) and will also be able to assess the impact that NTS supply inputs could have on the CV of gas being delivered to the LDZ.
- Define the accuracy, type and function of each measurement system from network entry to network exit. Draw up a technical specification for each measurement system (including communications systems).

- Conduct a market survey to establish whether technical solutions that satisfy the specifications are already available or whether they need to be developed or adapted for these applications.

- Define a network or number of networks with appropriate upstream HP Distribution pipeline systems for a potential field trial that have different supply inputs. Establish suitable measurement locations ideally using existing infrastructure such as pressure regulator stations, district governors etc.

- Establish how energy will be attributed to the point of use if, as is likely, the measurement equipment is not actually at the customer's premises.

Working with NGGD, establish the scope, cost, location, duration and potential benefits and risks of any field trial to be conducted under NIC.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

The Flow Weighted Average Calorific Value (FWACV) billing regime was introduced in 1996/7 to reduce the quantity of unbilled energy in the networks.

However, as a result of the requirement to average out the CVs of multiple entry points and the restriction that FWACV cannot be more than 1 MJ/m3 above the lowest CV entering the charging area, higher CV gases can be unbilled and lower CV providers are forced to enrich their gases to avoid the CV cap being imposed on the whole network. Bio-methane producers, for example, are enriching their small volumes of "green" and GS(M)R compliant gas with propane.

Hence, the current FWACV billing regime is a potential barrier for the injection of volumes of gas with calorific values (CV) that are significantly higher or lower than the prevailing FWACV of the network.

The FWACV regime also impacts on the control and movement of gas around the National Transmission System – an alternative regime may be beneficial for the Gas Transmission business and facilitate the introduction of shale gas in the high-pressure tier.

Currently, measurements of CV and volume are made at network entry points and the FWACV applied to the whole network. In order to facilitate entry of new and different sources of compliant gas, an investigation into billing and measurement points closer to the point of use is required; the new billing system needs to identify all stakeholders and provide a mechanism of opening up the gas market to entry of all gas that complies with GS(M)R and network entry requirement.

Method(s)

A feasibility study will be undertaken to investigate a different billing system. The work will involve novel network modelling from the NTS offtake to the point of use including within-day demand modelling.

The results will inform the project on how variations in gas quality affect the customer at the point of use, where measurements of energy content need to be made and how accurate these measurements need to be.

In parallel, work will be undertaken to survey the suitability of measurement equipment commercially available. A suitable network for a field trial will be identified and modelled. The feasibility study may subsequently be used for an NIC proposal for submission of funding in 2015.

Scope

The following scope will be undertaken:

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- Define the different sources of gas and how each may impact on the billing regime – this includes future supplies such as hydrogen injection, shale gas, coal-bed methane, storage and peak shaving and bio-methane.
- Consider other NIC projects that may impact on billing – for example, the extension of GS(M)R to include unballasted .
- Look at billing solutions in other countries operating regulated gas networks to establish and benchmark best practice.
- Establish whether it is possible to exempt a certain total volume from small suppliers from the FWACV billing process (that is, determine the total amount of low or high CV gas that impacts on the stakeholders). Use different scenarios to establish which

combinations of network design, flows and CVs have no impact on end users and those which have a significant negative or positive impact. Engage with Ofgem.

- Review the factors affecting the delivery of gas to an end user – location on network, variation in demand affecting source of supply, summer-winter governor settings, gas storage use, HP Distribution system operation and interaction with NTS etc. and evaluate various options for locations of CV measurement systems.
- Use existing network models of real NGGD systems (with permission those previously used under IFI) or generate generic network models to establish where extra measurements may be required to maximise the benefits to all stakeholders. This modelling could include all pressure tiers within NGGD (LP to HP Distribution) and will also be able to assess the impact that NTS supply inputs could have on the CV of gas being delivered to the LDZ.
- Define the accuracy, type and function of each measurement system from network entry to network exit. Draw up a technical specification for each measurement system (including communications systems).
- Conduct a market survey to establish whether technical solutions that satisfy the specifications are already available or whether they need to be developed or adapted for these applications.
- Define a network or number of networks with appropriate upstream HP Distribution pipeline systems for a potential field trial that have different supply inputs. Establish suitable measurement locations ideally using existing infrastructure such as pressure regulator stations, district governors etc.
- Establish how energy will be attributed to the point of use if, as is likely, the measurement equipment is not actually at the customer's premises.

Working with NGGD, establish the scope, cost, location, duration and potential benefits and risks of any field trial to be conducted under NIC.

Objective(s)

- To review the current billing and measurement arrangements and recommend potential alternative arrangements that would not be a barrier to alternative gas supplies and is fair to consumers.
- Inform an NIC bid

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

- Production and agreement of a study proposing alternative billing arrangements for further investigation.
- The basis for work to be included in an NIC submission

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project is a desk based study based in Loughborough at DNV GL and NGGD offices in Hinckley, looking at systems currently used.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL3 Proof of Concept

Geographical Area

The project is office based in the Midlands, (Loughborough and Hinckley).

Revenue Allowed for the RIIO Settlement

This work does not immediately give savings under the RIIO settlement, but has the potential to maximize the currently system and new sources of gas which could lead to lower fuel costs.

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):

NGGD

£140,123 external costs (inc 10% contingency)

£46,707 Internal costs

£186,830 total NIA Project Expenditure

NGN

£ 23,550 external costs

£7,850 Internal costs

£31,400 total NIA Project Expenditure

Total NIA Expenditure £218,230

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)

Based on 60 sites where the addition of propane to higher the CV of a new supply is avoided, it is estimated that there could be a saving to the connection customer of £9m.

Please provide a calculation of the expected benefits the Solution

A financial benefits case is not required as the TRL level is below 4.

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

Not Applicable

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

Not Applicable

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 amendment of the billing regime and measurement techniques would be applicable to all of the GDNs

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

This work could impact on the ability of alternative gas providers to access the system

☑ 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

- [x] Yes