

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 2017

### Project Reference Number

NIA\_NGGD0093

## Project Registration

### Project Title

Assessment of Bioenergy Resource Potential for UK Biomethane

### Project Reference Number

NIA\_NGGD0093

### Project Licensee(s)

Cadent

### Project Start

February 2017

### Project Duration

0 years and 6 months

### Nominated Project Contact(s)

NGGDx – Adebayo Oyegoke

### Project Budget

£48,000.00

## Summary

- Critically appraise and update the estimates for each UK-derived biomass feedstock presented in the aforementioned CCC study; and
- Produce a forecast of the total sustainable primary bioenergy (and therefore the TWhpa of renewable gas) which will be available from UK-derived feedstock through to 2050.
- The primary scope relates to waste and biomass material which can be converted thermally to renewable gas, but will also report on potential volumes of gas from Anaerobic digestion

### Nominated Contact Email Address(es)

Innovation@cadentgas.com

## Problem Being Solved

The UK has recently committed to its fifth Carbon Budget as part of its ambitious carbon reduction plan. Heat contributes a third of the UK's carbon emissions. However, the Committee for Climate Change has highlighted that whilst there has been progress in decarbonising the power sector, there has been 'almost no progress in the rest of the economy', citing specifically the slow up take of low carbon heat. The Carbon Plan identifies that by 2030 there is a requirement for between 83-165TWh of low carbon heat per annum. In 2015 the combined domestic and non-domestic RHI delivered less than 4.5TWh. Therefore, a step change in low carbon heat is required.

A number of solutions to this problem have been proposed including electrification through heat pumps, biomass boiler and heat networks. All of these will play a part, but there are two significant barriers: (a) heat demand is highly variable, which places particular challenges and costs on such low carbon solutions, and (b) they require that the consumer makes substantial changes to their own heating system, which represents a significant barrier to adoption as demonstrated by the NIA funded Bridgend study by WWU in 2015.

Renewable gas cost-effectively capitalises on existing gas distribution assets which are designed to deliver peak heat, and importantly means that customers do not require disruptive and expensive changes in their homes. Biomethane can be produced from both Anaerobic Digestion, as well as thermal means. Production of BioSNG production from waste is being demonstrated in Swindon under NICNGGD02 and also from pure biomass by Gobigas and Engie in Sweden and Holland respectively. BioSNG substantially increases the volume and types of feedstock which can be converted to renewable gas compared with AD, which means that renewable gas has the potential to make a significant contribution towards UK heat demand

National Grid's Future of Gas evaluation of renewable gas potential of 100TWh is based on the volume of UK sustainable biomass feedstocks available in the UK as assessed by the Committee for Climate Change (CCC) Bioenergy Report (2011). This report highlighted that assumptions relating to lifecycle emissions and land use constraints are critical considerations in determining how much energy might be derived from biomass sourced from the UK. It also emphasised other sustainability factors including tensions between food and bioenergy production alongside consideration of the availability of waste feedstocks.

Given the very current focus on understanding the decarbonisation options for the gas network in policy terms, it is important to produce an up to date assessment of the biomass potential from these sources in order to underpin and reassess the renewable gas potential. This is critically important as it is a key factor in determining policy options for decarbonised heat. This needs to review and update the assessment, recognising current waste and sustainability policy positions where understanding has developed significantly over the last 6 years, as well as seek to address some of the uncertainties in the assessment of waste arisings.

## Method(s)

- There are very different market drivers and constraints which determine the availability of wastes and non-waste forms of biomass. Consequently, the work will require two sets of subcontracted specialists working alongside each other. However, the main output from the work will be a single report.
- The partners will undertake a tender process to select appropriate specialist contractors to undertake the work to deliver the quality output and deliver value for money as well as provide an independent assessment.
- Primarily the report will be divided into 'waste feedstocks' and 'non-waste feedstocks'

## Scope

- Critically appraise and update the estimates for each UK-derived biomass feedstock presented in the aforementioned CCC study; and
- Produce a forecast of the total sustainable primary bioenergy (and therefore the TWhpa of renewable gas) which will be available from UK-derived feedstock through to 2050.
- The primary scope relates to waste and biomass material which can be converted thermally to renewable gas, but will also report on potential volumes of gas from Anaerobic digestion

## Objective(s)

- Critically appraise and update the estimates for each UK-derived biomass feedstock presented in the aforementioned CCC study; and
- Produce a forecast of the total sustainable primary bioenergy (and therefore the TWhpa of renewable gas) which will be available from UK-derived feedstock through to 2050.
- Produce a sensitivity analysis with a clear 'central' scenario to be produced for both waste and non-waste feedstocks.
- To provide an independent report to provide to policy and other stakeholders which demonstrates the volume potential for renewable gas to 2050.

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

n/a

## Success Criteria

The key successful outcome for this work will be a report which is a robust, independent and up to date assessment of UK bioenergy resource and therefore biomethane potential to inform key stakeholders in the development of policy relating to low carbon heat.

The delivered report must meet the core objectives laid out above.

## Project Partners and External Funding

n/a

## Potential for New Learning

n/a

### **Scale of Project**

This project is done at the relevant scale which is a desk top study. The impact of this study will inform UK policy with regard to low carbon heat.

### **Technology Readiness at Start**

TRL6 Large Scale

### **Technology Readiness at End**

TRL7 Inactive Commissioning

### **Geographical Area**

This is a desktop study and its implications will be UK wide.

### **Revenue Allowed for the RIIO Settlement**

Not Applicable

### **Indicative Total NIA Project Expenditure**

NGGD Costs

£48,000 total Project expenditure

## 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)

Modelling by National Grid's Energy Strategy and Policy Group showed that the adoption of 100 TWh pa of renewable gas could lead to savings to the energy system of £3.9bn per annum by 2050 due to avoided costs across the energy system. The majority of this benefit would be realised by gas customers and would represent a total saving per household of £282 over the period from 2030 to 2050.

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

This was assessed in the NICNGGD02 as outlined above

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

Adoption of 100TWh of renewable gas would equate to around 150-300 BioSNG plants across the UK

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

This was assessed in the NICNGGD02 as outlined above.

### 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 output will be a comprehensive report which is designed to be shared with key policy stakeholders to inform the debate on the role for renewable gas in delivering low carbon heat. This is of value to all the Network Licenses who are developing their future strategies.

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

Establishing the role and enabling the deployment of renewable gas onto the gas network.

- 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