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 2016

Project Reference Number

NIA_WWU_031

Project Registration

Project Title

Cornwall Energy Island

Project Reference Number

NIA_WWU_031

Project Licensee(s)

Wales & West Utilities

Project Start

February 2016

Project Duration

0 years and 6 months

Nominated Project Contact(s)

Steve Harding (Project Manager)

Project Budget

£86,197.00

Summary

The research project will include reviewing the existing gas network and energy demands in Cornwall in the context of meeting the criteria in the “problem” section above, as follows:

- Past, present and future seasonal base and Peak Energy Demand provided by the Gas Network and that which would potentially need to be met by other energy sources. This will include looking at any challenges and/or ‘gaps’ in current proposals for using alternative energy sources, for example, the capability to store energy to meet seasonal and peak demands.
- Modelling a range of scenarios using the existing gas network and lower carbon gas to meet different seasonal energy demand options in Cornwall. This will include as a minimum the six scenarios of 100%; 50%; 30%, 20%, 10% of domestic gas supply; and base domestic gas load being provided by lower carbon gas and/or other alternative energy sources, including solar and wind. Each of these scenarios respectively will include the following:
- Reliability, Availability, Resilience & Sustainability of the energy provided by lower carbon gas using the existing gas networks and that of other alternative energy sources, for example, solar and wind. This will include this requirement being considered in conjunction with the interrelated aims of costs and carbon savings, as appropriate.
- Likely costs of the various scenarios to key stakeholders, for example, domestic consumers, including fuel poor consumers in Cornwall.
- Reasonable investment needed into the gas network infrastructure in the County of Cornwall to provide for lower carbon gas supplied by the existing Gas Network and to estimate other investment in alternative energy sources, including solar and wind.
- The existing storage of energy in the Gas Network, and the capacity and storage capability of the Gas Network in Cornwall for future scenarios. The storage implications for alternative energy sources, including solar and wind.
- The environmental impact from the various scenarios, to work towards Cornwall becoming as close to carbon neutral as necessary, including the carbon saved to support Cornwall in achieving carbon reduction targets from heating and cooking and to meet Climate Change objectives.
- How the proposed scenarios are likely to impact on consumer behaviours and implementation feasibility over various future time periods.
- Researching various time horizons to deliver practical and workable solutions, including addressing physical constraints, costs and time taken in changing consumer behaviour(s).

For the purposes of the study and to keep the variables within reason, this research will focus on average domestic properties in

Cornwall and within the existing estimated energy demands for domestic properties in Cornwall.

Nominated Contact Email Address(es)

innovation@wwutilities.co.uk

Problem Being Solved

This project aims to research and understand how the existing Gas Network in Cornwall could be used to support the County of Cornwall in becoming as close to 'carbon neutral' as necessary, and reduce carbon emissions from heating and cooking in Cornwall, by using renewable energy including lower carbon gas along with other alternative energy sources, for example, solar and wind. This will include a 'bottom up' approach to consider the impact on energy for end consumers in individual dwellings in Cornwall. Comparing and contrasting different potential scenarios to supply energy, including solar, wind, low carbon gas, natural gas, and a combination of using different options in a multi-option energy supply strategy. This will include the current capability to store energy.
In order to achieve practical and workable solutions which meet these aims and to recommend options to enable Cornwall to work towards solving the Energy Trilemma, this research will include practical proposals which will aim to satisfy the following criteria

- Reliability, Availability, Resilience & Sustainability - Energy Consumers rightly demand a reliable and resilient supply of energy when they need it on an ongoing basis; demand a readily available supply including meeting ongoing demands and peak demand needs; and need sustainable solutions into the longer term (2050 and beyond); to ensure ongoing security of supply.
- Best Cost for all Stakeholders – Energy Consumers Domestic, Commercial and Industrial users (demand side) want the best cost they can get when meeting their energy needs so that they can minimise their energy bills and be competitive. Businesses who provide energy (supply side) want to provide the best price and service to their customers and stakeholders i.e. to provide a good service and price to end consumers; and a financial return on investments for their investors.
- Environmentally Considerate Energy Provision – Energy Supply and Demand provisions and solutions are needed which must offer the best environmental solutions, at best cost using sustainable supplies. 'We are committed to reducing greenhouse gas emissions in the UK by at least 80% by 2050, relative to 1990 levels'. (DECC)
- Consumer Behaviours – The UK Gas Industry has experience of understanding consumer behaviour(s), specifically relating to changing to alternative energy sources for heating and cooking and this research will include considering this critical success factor within reasonable timescales.

Method(s)

This is a research project that will look at alternative energy sources for comparison purposes such as wind, and solar. The research into Gas Networks may be undertaken with some collaboration with the Cornwall Energy Network (CEN) Consortium, existing experts and existing and new lower carbon gas producers and other alternative energy producers.

The research will gather existing data from current energy usage and demands in Cornwall. This will include reviewing the existing gas network. This existing data and information can then be used a baseline to allow a new range of at least six scenarios, of 100%; 50%; 30%, 20%, 10% of domestic gas supply, to be modelled. These scenarios will use alternative energy sources from; lower carbon gas and/or other alternative energy sources, including solar and wind. From current energy consumption levels we can then simulate energy consumption levels from the new sources of energy and use the various scenarios modelled to compare their effectiveness.

An independent review of the project outputs will be conducted.

Scope

The research project will include reviewing the existing gas network and energy demands in Cornwall in the context of meeting the criteria in the "problem" section above, as follows:
•Past, present and future seasonal base and Peak Energy Demand provided by the Gas Network and that which would potentially need to be met by other energy sources. This will include looking at any challenges and/or 'gaps' in current proposals for using alternative energy sources, for example, the capability to store energy to meet seasonal and peak demands.
•Modelling a range of scenarios using the existing gas network and lower carbon gas to meet different seasonal energy demand options in Cornwall. This will include as a minimum the six scenarios of 100%; 50%; 30%, 20%, 10% of domestic gas supply; and base domestic gas load being provided by lower carbon gas and/or other alternative energy sources, including solar and wind.
Each of these scenarios respectively will include the following:

- Reliability, Availability, Resilience & Sustainability of the energy provided by lower carbon gas using the existing gas networks and that of other alternative energy sources, for example, solar and wind. This will include this requirement being considered in conjunction with the interrelated aims of costs and carbon savings, as appropriate.

- Likely costs of the various scenarios to key stakeholders, for example, domestic consumers, including fuel poor consumers in Cornwall.
- Reasonable investment needed into the gas network infrastructure in the County of Cornwall to provide for lower carbon gas supplied by the existing Gas Network and to estimate other investment in alternative energy sources, including solar and wind.
- The existing storage of energy in the Gas Network, and the capacity and storage capability of the Gas Network in Cornwall for future scenarios. The storage implications for alternative energy sources, including solar and wind.
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- How the proposed scenarios are likely to impact on consumer behaviours and implementation feasibility over various future time periods.
- Researching various time horizons to deliver practical and workable solutions, including addressing physical constraints, costs and time taken in changing consumer behaviour(s).

For the purposes of the study and to keep the variables within reason, this research will focus on average domestic properties in Cornwall and within the existing estimated energy demands for domestic properties in Cornwall.

Objective(s)

To research the energy needs of Cornwall that will build on the outcomes of a previous suite of Network Innovation Allowance funded projects entitled ‘Bridgend Future Modelling’ . This project aims to investigate the capacity & storage of energy.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Delivery of a report that examines current energy demands in Cornwall and provides evidence that will allow discussion and decision-making from an enhanced understanding of any potential opportunities; and to aim to enable the UK Gas Networks to be in a position to plan and deliver any future strategic opportunities to help the UK meet the challenges of the energy trilemma and bring benefits to a range of stakeholders.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

Whilst the scope of this specific research focusses on the Gas Networks in the County of Cornwall, the research being undertaken will be scalable and relevant to address any strategic threats; and unlock any potential opportunities; and to aim to enable the UK Gas Networks to be in a position to plan and deliver any future strategic opportunities to help the UK meet the challenges of the energy trilemma and bring benefits to a range of stakeholders.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL2 Invention and Research

Geographical Area

The bottom up analysis will be based on the County of Cornwall.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

Total NIA project expenditure - £86,197

Project Value claimable under NIA (90% of total cost) - £77,577

The project is being wholly funded by NIA

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)

This research project will provide long term savings to GB customers by providing better information on which to base long term planning decisions.
This work will support the UK's strategic aim to decarbonise energy over the next 40 years.

Please provide a calculation of the expected benefits the Solution

Not required for research projects

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

Not required for research projects

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

The project outcomes may illustrate or demonstrate the need for further research & could influence future energy policy.

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

This research will provide the networks with a typical view of what it would take to deliver a low carbon solution to a County within the UK. This work will support the UK's strategic aim to decarbonise energy over the next 40 years. In addition, we will commission an independent review of the outcomes and conclusions to ensure that the learning generated from the project is sufficient for third parties to understand, preventing any risk of duplication and enabling replication of the findings.

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