

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

Dec 2019

### Project Reference Number

NIA\_CAD0048

## Project Registration

### Project Title

No Power Hot Water Feasibility

### Project Reference Number

NIA\_CAD0048

### Project Licensee(s)

Cadent

### Project Start

January 2020

### Project Duration

0 years and 3 months

### Nominated Project Contact(s)

Cadent Innovation Team

### Project Budget

£21,350.00

## Summary

Research to be undertaken by NPL to provide a summary as to the energy required to heat varying volumes of water by varying degrees & identify suitable technologies to achieve this vision.

### Nominated Contact Email Address(es)

Innovation@cadentgas.com

## Problem Being Solved

GDNs currently have a licence condition to provide fan heaters & hot plates to the most vulnerable customers during a gas outage to stay warm, heat water & food. However, some customers will not be able transfer the hot water to a bowl or sink to be able to wash or clean with. Additional cost to the customer to use alternative power to heat water has also been considered. There are occasions when the electricity is also disrupted so this solution would also resolve the issue for customers during both electricity & gas outages.

## Method(s)

Research to be undertaken by NPL to provide a summary as to the energy required to heat varying volumes of water by varying degrees & identify suitable technologies to achieve this vision.

## Scope

It is envisaged that the project will be executed utilising the Cadent change management approach with defined success criteria for each of the phases and deliverables.

The sanction value is to fund research into the feasibility of heating water without power. This will be completed in 1 month with a report and presentation of the possible solutions.

## Objective(s)

The project will be led by National Physics Laboratory (NPL). They have been chosen for their expertise in thermal development, temperature measurements & control.

**Key Objectives & Deliverables:**

NPL will provide a summary as to the energy required to heat varying volumes of water by varying degrees.

NPL will identify suitable technologies that could achieve this vision, including but not limited to: chemical heating technologies, phase-change materials, and electrical storage e.g. batteries. Consideration will be given to other parameters, including how much of the heating material (weight & size) would be needed to cause specific temperature rises (for varying quantities of water), costs, availability, and toxicity.

A report will be prepared which summaries the various technologies and provides some examples of how they might be used for this application, with quantitative examples

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

n/a

**Success Criteria**

Solution identified to take forward for development in next phase

**Project Partners and External Funding**

Energy Innovation Centre & National Physics Laboratory

The project will be wholly funded by the NIA

Cost for project inc Externals, Internals & Contingency = £21,350

**Potential for New Learning**

This research will identify solutions which will feed into the next phase to develop and manufacture.

**Scale of Project**

The scale of this project will be across all Cadent networks however learnings will inform all Gas Distribution Networks which all utilise the PSR database to manage their customers who would be in vulnerable situations. The scale of investment in this project is necessary as feasible solutions have not yet been identified heat water without power.

**Technology Readiness at Start**

TRL2 Invention and Research

**Technology Readiness at End**

TRL3 Proof of Concept

**Geographical Area**

This project will be delivered by National Physics Laboratory (NPL) & Cadent Gas Safeguarding Team.

**Revenue Allowed for the RIIO Settlement**

No revenue allowed for in the RIIO settlement.

**Indicative Total NIA Project Expenditure**

Total cost: £21,350

Plus future phases to develop & trial solutions

## 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)

At this point the view on savings is speculative, but would improve CSAT scores by offering a safe alternative to stay clean and could reduce impact on consumer electricity bills.

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

Not applicable as research only

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

Around 15% of households within our networks are on the PSR database and would benefit from the solution during gas interruptions. This is also a possible solution for electricity customers during outages as such outages can impact the boiler.

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

Unknown at this time as early stages of research

### 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

Learnings will inform all Gas Distribution Networks which all utilise the PSR database to manage their customers who would be in vulnerable situations

### 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 project supports the strategy to continually improve safety & emergency. Ensuring customers are offered the best alternative whilst the supply is interrupted.

- 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.

The only similar NIA funded project was completed by NGN (NIA\_NGN\_231) Temporary provision for hot water which delivered an asset management tool for the optimised selection and delivery of researched (evaluated) temporary hot water supply solutions. This research did not identify an affordable no power solution which would not impact the customers property. No other similar projects were identified on the ENA Portal.

### 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

No current method of heating larger volumes of water to a safe temperature for customers to use to wash and clean with. Previous research has been conducted by NGN however did not identify a solution.

### 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

The Network Licensee will not fund this project as business as usual due to its innovative nature of work, and the high level of risk

associated with the possibility that solutions will prove to be unsuitable for this type of user application.

**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**

This project can only be undertaken with the support of the NIA as it looks to innovatively explore possible solutions that include known technologies not previously used to heat water.

**This project has been approved by a senior member of staff**

Yes