

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

Sep 2018

### Project Reference Number

NIA\_CAD0026

## Project Registration

### Project Title

Alternative Preheat Solutions

### Project Reference Number

NIA\_CAD0026

### Project Licensee(s)

Cadent

### Project Start

October 2018

### Project Duration

0 years and 10 months

### Nominated Project Contact(s)

Cadent Innovation Team

### Project Budget

£87,320.00

## Summary

The supplier will conduct a technology identification study for methods use by other industries that could be quickly developed and demonstrated for a range of preheating scenarios on the Cadent network.

### Nominated Contact Email Address(es)

Innovation@cadentgas.com

## Problem Being Solved

With increasing environmental challenges and ageing preheat assets that need replacement, Cadent are keen to explore novel methods of heating which have not been used in the UK gas transportation industry before. Current practice for replacement is to adopt existing preheating technologies, which increase the gas temperature before pressure reduction. These technologies are often slow to respond to gas outlet temperature changes whilst also being costly to operate and maintain. Along with these engineering challenges, the current technologies also operate with significant and damaging environmental emissions.

## Method(s)

The supplier will conduct a technology identification study for methods use by other industries that could be quickly developed and demonstrated for a range of preheating scenarios on the Cadent network.

## Scope

WP1

- Site visit(s) to see the existing water bath heaters and speak directly to maintenance or engineering staff about the issues associated with the current process.
- Review of existing documentation on work to date in developing preheating solutions.

WP2

- Research of available heating solutions in industry and identification of concepts that might be applicable to preheating gas for CADENT's various scenarios.
- Develop a solution matrix to prioritise concepts or technologies against the identified Cadent scenarios and requirements.

### WP3

- The supplier will host a workshop with key personnel from Cadent to present findings and establish plan for progressing further development of each preferred solution.
- Produce report to capture the work conducted throughout the project. The report is to include:
  - o Development plan/roadmap on how technologies are to be further developed.
  - o The success criteria of the project.
  - o Assessment on how the project performed compared to the original project aims, objectives and success criteria.
  - o Recorded description of any required modifications to the planned approach during the course of the project.
  - o Lessons learnt for future projects.
  - o Summary of the outcomes of the project.

### Objective(s)

- Identify CADENT's current preheating scenarios and the requirements for each.
- Review documentation from CADENT on preheating systems trialled to date.
- Review NIA documentation on preheat systems trialled to date.
- Research of available heating solutions in other industries — identify concepts that might be applicable to preheating at Cadent network.
- Prioritise preferred solutions for each preheating scenario for further development and, identify any gaps in a solution matrix.
- Plan for progressing further development of each preferred solution.

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

n/a

### Success Criteria

- A presentation or poster documenting in detail CADENT's preheating requirements for the agreed scenarios.
- A presentation of identified technologies or concepts and applicability to CADENT's requirements.
- A workshop at MTC to establish a plan for progressing further development of each preferred solution.
- Workshop minutes detailing the results of the workshop.

### Project Partners and External Funding

Cadent and The Manufacturing Technology Centre (MTC).

The project will be wholly funded by the NIA.

Total: £87,320

### Potential for New Learning

The utilisation of alternative preheating solutions could improve the efficiency of the gas distribution and potentially developed a more resilient network of gas distribution.

### Scale of Project

The scale of the project is across all Cadent Networks where alternative preheating solutions are required. This work will inform all Gas Distribution Networks that have similar issues with preheating systems in their networks. The scale of investment in this project is necessary due to the current lack of understanding and applicability of alternative preheating solutions in the gas industry.

### Technology Readiness at Start

TRL2 Invention and Research

### Technology Readiness at End

TRL2 Invention and Research

### Geographical Area

The project will be delivered from the supplier facilities in Coventry and the Cadent offices in Hinckley, across the Cadent geography.

### Revenue Allowed for the RIIO Settlement

Yes for Preheat replacement of ageing assets. Innovation funding is to support new and novel preheat technology that has not been considered by the gas industry previously

### Indicative Total NIA Project Expenditure

£87,320

## 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)

The final output of the project will outline alternative preheating solutions for the Cadent network. This project will support Cadent to make the required decisions and recommendations to assess the most efficient technologies to explore alternative preheating solutions.

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

Although a research project it is anticipated that success criteria for new and novel technologies will lead to a reduction in harmful emissions, along with reductions in operating, maintenance and decommissioning costs. Successful novel technologies will be selected against these criteria.

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

Alternative preheating solutions will be replicable across all networks. The replicability of methods is not part of this study as it is a research based project.

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

This is not applicable at this stage of the project. This project is a research study.

### 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 project will determine if alternative preheating solutions can be used safely and effectively in the gas industry, which will provide more cost effective techniques for preheating systems in other 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 project supports Cadent Gas' drive to develop more efficient distribution 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.

This project does not lead to unnecessary duplication as it is directly researching for alternative preheat solutions, and these alternative techniques are not fully understood within the gas industry.

### 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

This Project is innovative as it involves researching into alternative preheating solutions from other industries and assessing the potential of these technologies crossing over to the gas industry.

### 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 would not fund the project as BAU as deploying preheat technology outside the gas industry carries significant

risk both technically and operationally. The Manufacturing Technology Centre has multi-sector experience and knowledge to help meet this shortfall.

**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**

The Network Licensee is funding the project via NIA due to risks associated with new untested technologies. It is also likely that foreground IPR opportunities will be very limited and therefore innovation investment risk is too high for a self-funded approach.

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

Yes