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

Nov 2024

Project Reference Number

NIA_CAD0110

Project Registration

Project Title

SHINE Non-Electric Boiler

Project Reference Number

NIA_CAD0110

Project Licensee(s)

Cadent

Project Start

November 2024

Project Duration

0 years and 9 months

Nominated Project Contact(s)

Innovation@Cadentgas.com

Project Budget

£90,000.00

Summary

Power outages are a regular occurrence in Great Britian with average annual customer minutes lost in Great Britain range between 31.57 minutes 51.4 minutes depending on the Distribution Network Operator License Area (Statista, 2021). This is of course not evenly distributed with outages varying from a few minutes up to more than a week in more extreme circumstances. Similarly, single outages can affect a single property or several thousand properties depending on the cause.

This project will aim to develop a low-cost, user-friendly solution, whereby customers in vulnerable situations will still be able to use their gas heated boiler, as well as LPG and oil heated boilers, in the event of a power outage.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

In the event of a power outage, gas heated boilers will no longer work as they require electricity to ignite the boiler. Therefore, in collaboration with SSEN and our project partners CEE, we are looking to develop a low cost solution that will enable gas boilers, as well as LPG and oil heated boilers, to stay ignited in the event of a power outage.

Method(s)

Gas boilers require electricity for ignition; the challenge is to find a solution that enables a gas heated boiler, as well as LPG and oil heated boilers, to work in the event of a power cut and therefore continue to provide heat to the household. Current practices often involve supplying customers with alternative heat sources, which are expensive, not environmentally friendly, and are often not suitable for customers in vulnerable situations. This project aims to overcome these limitations by developing a standardised Boiler Change-Over Switch Kit that allows homeowners to automatically switch their boiler's power source to a plug and connect it to a renewable

energy system such as a battery. This eliminates the need for extensive wiring and provides greater flexibility in managing home heating needs.

Data Quality Statement

The project will ensure that necessary data is of sufficient quality and readily available to meet the objectives of the project. This will be achieved by providing current relevant PSR data, to enable development to progress in the correct manner.

Measurement Quality Statement

The project will utilise data directly from the PSR, only that is relevant and proportional to the project. This data will be reviewed with the wider project team regularly to ensure transparency and consistency.

Scope

The overall scope is broken down into five stages as listed below:

Stage 1 Requirements Gathering; – to engage with stakeholders, define kit requirements, study boiler power needs.

Stage 2 Data Transfer, Analysis and Cleaning; to build and test Boiler Change-Over Switch Kit prototype, refine design.

Stage 3 Testing; to verify performance under different conditions and analyse data for improvements.

Stage 4 Operational Testing and Deployment Approach; to test in a representative environment, monitor feedback, improve design and installation process.

Stage 5 Develop prioritisation approach for PSR registrants' access during loss of supply incidents.

Objective(s)

Stage 1

To understand the heating and power needs of customers.

To establish functional and non-functional requirements for the Boiler Change-Over Switch Kit.

To understand the power requirements for different boiler systems.

Stage 2

To develop and demonstrate the construction of a functional Boiler Change-Over Switch Kit prototype.

To develop a kit that is compatible with common boiler models.

To develop documents that clearly explain how to use and install the kit.

Stage 3

To develop a kit that is functional, durable, and safe for deployment.

To showcase that the kit performs in various conditions and scenarios.

Stage 4

To gather real-world data and feedback from users and installers.

To implement the evaluated data into the final project deliverables.

To develop a clear approach for delivery and installation.

Stage 5

To provide clear and repeatable instructions of the PSR prioritisation process.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

This project has been input into the Consumer Vulnerability Impact Assessment Tool and there are no negative impacts on consumers in vulnerable situations therefore there is no need to take mitigation measures.

Success Criteria

· The device will reliably and automatically switch between power sources.

· The devices will be compatible with a range of boiler models and configurations commonly used in residential settings.

· Be user friendly with clear instructions and intuitive operations to minimise installation and usage complexities.

· The solution should solely operate the boiler or system controls without any possibility of connecting back to the household circuits.

· Offer value for money, comparing the benefits of greater energy resilience to the overall cost of installation and operation.

Project Partners and External Funding

The project partners for this project are Centre for Energy Equality (CEE) and SSEN, who will be our collaborate partner on the project. The project will be wholly funded via NIA.

Potential for New Learning

Utility companies will be able to develop a new approach for customers in vulnerable situations and provide a more stable solution to enable them to maintain the use of their heating system during power cuts and disruption to the grid.

All reports will be published on the ENA Smarter Networks Portal.

Scale of Project

The project will be delivered as detailed and will aim to bring significant advances relating to being able to use Gas, LPG and Oil heated boilers in the event of a power outage and how this ensures customers in vulnerable situations have the capacity to stay warm. If the scale was lessened, it would significantly reduce the benefit received from the project and the positive impact it could have on customers.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL7 Inactive Commissioning

Geographical Area

The project is development based and is applicable to Cadent's and SSEN's Networks.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

Total external costs: £90,000

Total internal costs: £9,000

Total NIA expenditure: £99,000

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:

There are many beneficiaries of the project – including both PSR customers and those in vulnerable situations; by being provided with a safe method to heat water in their homes during a power outage. This project will aim to develop a device that will ensure that in times of a power outage, customers in vulnerable situations, and especially those with medical needs, can stay warm and have access to hot water. There are several medical conditions where there is a need to stay warm, including Heart conditions, Pneumonia, Living Post stroke, which would benefit from this project. The project could also help in removing the feeling of anxiety some customers may have when they use the current provisions provided, such as expense to run current provisions, cumbersome/intrusive options such as oil filled radiators or the need to utilise facilities outside of the home. By having this new product, it would allow the customer to feel more reassured and therefore live more independently.

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)

N/A

Please provide a calculation of the expected benefits the Solution

The aim of the project is not necessarily to see financial benefits but to improve the experience of customers in vulnerable situations and potentially the wider public when they are is a power outage. In addition, the project could provide the following benefits:

§ Financial – Reduce need for delivering alternative heat sources; reduce penalties to the Network.

§ Health and safety - Reduce risk for customers on PSR who medically require hot water and/or heat.

§ Community - Vulnerable population less likely to be affected by power outage and improve reputation.

§ Customers - Increase reliability and availability of heating and power supply during grid outages or energy disruptions.

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

Project reporting will quantify the scale and cost of the opportunity of implementation taken from this project.

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

Roll out cost are not within scope as the end TRL level is 7.

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 learnings from this project could be adopted by other Network licenses. However, the cost and methodology to roll this is out have not yet been developed

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

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.

A thorough check has been completed and no similar projects have been identified. All networks were informed of the project via a project notification form on huddle and no issues of duplication have arisen.

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

Non-Electric Boiler or similar solutions have not been identified previously across all GDNs and thus makes this project innovative.

Relevant Foreground IPR

The project and the resultant outcomes/deliverables will conform to the default treatment of IPR as set out under the agreed NIA Governance (where the default requirements address two types of IPR: Background IPR and Foreground IPR)

Data Access Details

Any consumer data gathered throughout this project will be anonymised and will be compliant with General Data Protection Regulations (GDPR) and the UK Data Protection Act. Any compliant data can be made available for review upon request.

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

The scale of the issues at hand is unknown and therefore there is a high level of uncertainty associated with the project which would be

beyond the network licensees' risk appetites. This piece of work is to better understand the opportunities to be able to use a gas boiler when customers are in a power cut.

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 high-level risk associated with the low TRL project is beyond the current risk appetites of networks. NIA will allow us to complete this project to better inform future decisions and opportunities.

This project has been approved by a senior member of staff

☑ Yes