

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 2020

### **Project Reference Number**

NIA\_NGN\_283

## **Project Registration**

### **Project Title**

InTEGReL: Academic review of fuel poverty, vulnerability and GB research capability

### **Project Reference Number**

NIA\_NGN\_283

### **Project Licensee(s)**

Northern Gas Networks

### **Project Start**

November 2020

### **Project Duration**

0 years and 5 months

### **Nominated Project Contact(s)**

Keith Owen

### **Project Budget**

£71,250.00

## **Summary**

To fully understand the challenges of energy decarbonisation in the domestic and light commercial sectors there is a need to capture the broad range of research previously undertaken. This is needed to secure our knowledge of current thinking and identify knowledge gaps across a range of agreed topics. This knowledge enables the InTEGReL Customer Energy Village to be utilised more meaningfully to drive out new approaches, technologies, solutions and business models that accelerate and underpin the route to Net Zero.

## **Preceding Projects**

NIA\_NGN\_345 - Customer Energy Village: Project 1: Energy Efficiency

## **Third Party Collaborators**

Newcastle University

## **Nominated Contact Email Address(es)**

innovation@northerngas.co.uk

## **Problem Being Solved**

To fully understand the challenges of energy decarbonisation in the domestic and light commercial sectors there is a need to capture the broad range of research previously undertaken. This is needed to secure our knowledge of current thinking and identify knowledge gaps across a range of agreed topics. This knowledge enables the InTEGReL Customer Energy Village to be utilised more meaningfully to drive out new approaches, technologies, solutions and business models that accelerate and underpin the route to Net Zero.

## **Method(s)**

Newcastle University [InTEGReL Partner] will undertake a systematic review to capture the latest research from across academia. They will interlink this review with a parallel piece of work from Northern Powergrid to explore the electricity aspect of this same issue and engage with Northumbrian water to identify the sustainability issues at large.

## Scope

The review will entail analysis of available research in the following areas:

I. High level insight into the existing built-environment research facilities across the UK to determine for each demonstrator:

- The current capability and also the limitations of the facility
- Opportunities for InTEGReL CEV to lead and remain unique
- Benchmark InTEGReL against UK capability and further afield [EU]
- Inform future design and instrumentation aspect of CES

II. Decarbonisation of domestic and light commercial buildings

- The role of hydrogen and other green gases to decarbonise natural gas.

III. The relationship between consumer vulnerability and the transition to Net Zero

- Identification of types of vulnerabilities
- What is the effectiveness of educational material aimed at vulnerable customer groups regarding net zero transitions?
- What educational material is needed by the energy sector in the future [training and competency etc. of sector employees]?
- Is there an energy bias?

IV. The role of digital to support the transition by:

- Identifying the minimum digital capability needed to enable transition to Net Zero for all
- Additional benefits from digitalisation and IoT implementation in CEV (i.e. products to automate controls/economise, etc.)

V. Solutions to support a fair transition

- The impact of digital exclusion on consumer
- If and how more affluent groups might solely benefit from new technologies
- What is the minimum digital capability (consumer side) to ensure a fair transition?
- How can we ensure vulnerable groups also have access to the same opportunities?

VI. Analysis of the retrofit challenge which includes:

- At utility level, what systems, generations and connectivity are competing to create resilient communities? (link to II, IV)
- At household level, what impact retrofit has on demand and utility operation.

VII. Develop counterfactual of NPG heat demand modelling NIA

- To reflect on the likely impact on the gas grid of a widespread transition of heat on the electrical grid [counterfactual linked to NPG heat modelling and analysis NIA]
- To consider the impacts differing heat technologies would have on the gas grid.

## Objective(s)

To produce a final report that contains a comprehensive coverage of and recommendations across the following:

- Detailed gap analysis on how InTEGReL: CEV can be unique in meeting existing and future research needs.
- Benefit analysis of InTEGReL: CEV from a local and wider UK perspective
- Science perspective on the role of hydrogen as a decarbonising agent in future energy mix, its merits and limitations.
- Current perspectives on large scale building fabric retrofits and its impact on energy demand and utility planning
- What policies / white paper may assist in accelerating the realisation of Net Zero energy systems.
- How future research conducted through InTEGReL: CEV can be unique.
- What infrastructure (digital and energy-wise) is needed to support decarbonisation research
- Identification of key consumer benefits through InTEGReL CEV and subsequent research activities.
- Determine likely impacts of significant heat provision transferring to the electrical grid via different heat solutions. [linked to NPG heat modelling and analysis NIA]

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

n/a

## Success Criteria

The project will produce a final report outlining:

1. The relevant research papers with brief synopsis of partners to work with.
2. A clear gap analysis and recommendations on areas of future research and innovation for CEV.
3. An outline of the digital infrastructure needed to ensure InTEGReL:CEV development is equipped to produce sufficient data that can support items outlined in II.

## Project Partners and External Funding

Northern Gas Networks  
Newcastle University – funding contribution £40k  
Northern Powergrid

## Potential for New Learning

This research will define areas of new learning and close the knowledge gaps that currently persists in term of Net Zero, the retrofit challenge and the impact on connected utilities and customers, and specifically a focused view of vulnerability in that context.

## Scale of Project

Extensive review of the current landscape to better inform future projects and investments.

## Technology Readiness at Start

TRL2 Invention and Research

## Technology Readiness at End

TRL3 Proof of Concept

## Geographical Area

The project will be constrained to the Northern Gas Networks area.

## Revenue Allowed for the RII Settlement

N/A

## Indicative Total NIA Project Expenditure

External Costs = £25,000

Internal Costs = £6,250

Total Project NIA cost = £31,250

## 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)

As a result of the nature of this research project it is not yet possible to quantify benefits. This will become clearer as an output of this literature review

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

N/A - Research Project

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

This review will provide informative research for all networks to work with and enhance their customer proposition over the coming GD2 period.

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

N/A at this stage.

### 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 from this research will inform all gas and electricity distribution operators on the current level of research in place focusing on Net Zero and the fair transition and as such allows them to refine their operations to improve customer engagement and understanding in this area.

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

Customer Vulnerability: how might vulnerable customer's needs be met during the energy transition, how can networks support vulnerable customers and what needs to be done and what is the retrofit challenge and how might solutions in these areas impact utility operations

- 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 purpose of the review is to identify work already achieved and where gaps exist. From that future research can be shaped to plug these gaps and avoid duplication

### 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 is a research activity to understand where networks must focus their future research and innovation activity when targeting an accelerated drive to Net Zero. Given the ever-changing landscape and new technologies and thinking created across UK and wider academia it is essential that this work be undertaken to avoid duplication and give proper focus to those areas that have little background research in place.

### Relevant Foreground IPR

n/a

### Data Access Details

n/a

### Please identify why the Network Licensees will not fund the project as part of its business and usual

## activities

This activity is outside normal BAU functions, firmly looking at energy futures and the impact this has on the vulnerable, wider customer portfolio and the impact energy saving [retrofit] measure will have on the efficient distribution of energy and the transition to low carbon gas.

### **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 is a collaborative activity between Newcastle university, northern Powergrid and NGN and covers the NGN share of the research. It does not fit within any normal funding of the business and as such is supported through network innovation

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

Yes