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NIA Project Registration and PEA Document

Date of Submission

Dec 2018

Project Reference Number

NIA_CAD0032

Project Registration

Project Title

Hydrogen Perceptions, Practices and Possibilities in two UK communities

Project Reference Number

NIA_CAD0032

Project Licensee(s)

Cadent

Project Start

January 2019

Project Duration

0 years and 7 months

Nominated Project Contact(s)

Cadent Innovation Team

Project Budget

£63,000.00

Summary

The project will use both qualitative and quantitative research methods. The research process is set out below:

1. Literature review of factors affecting adoption of and perceptions toward energy innovation, ensuring the review looks across all energy vectors.
2. Characterise the two areas proposed for the public trials, using the socio-demographic variables found to be most pertinent to the study. This will be accomplished via a desk based study of the areas using 2011 census data, official labour market statistics, indices of deprivation data, and the ONS towns and cities analysis data.
3. Create a sampling frame to build a sample for HyDeploy2 that is representative of the proposed trial areas in consultation with partners.
4. Survey participants via two methods to balance scale of the sample and quality of the data.
 - a. Slow Survey Methodology – face to face surveying in a public place using both a structured survey and unstructured questioning. This approach guarantees the quality of the data. Target sample size is 100 participants.
 - b. Online Survey of between 500 and 1000 participants. This uses the same survey questions but expands the sample size to improve robustness and accuracy of findings. The results of the two approaches are carefully compared. Where the findings are sufficiently similar we are able to benefit from both the confidence that comes with face to face research with the scale and statistical significance of the online approach.
5. The results of surveys will be reported and presented to the project partners.

The research team at Newcastle University may also seek to publish these findings in order to expose the work to peer review and thus further enhance confidence in and profile of the research.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

Hydrogen holds the potential to play an important part in the future of low carbon energy use in the UK. However, the opportunities can only be realized if the use of hydrogen can become an accepted and uncontroversial part of everyday energy use. Currently there is considerable uncertainty about how communities and individuals would respond to the prospect of using hydrogen in their homes, businesses and vehicles, what barriers may exist and what perceptions of hydrogen may already be in place. It is also well established in research and applied contexts that public engagement with new technologies can be a complex process in which outcomes are not

always predictable. This is amplified yet further where there are perceived to be possible risks to safety and where long-held norms about the 'look and feel' of the materials of daily life are being challenged – both of which may be true of hydrogen. Perceptions of infrastructure and innovation can also vary across places and social demographic make-up of communities, including but not limited to economic profile, education and other cultural factors (McGowan et al., 2005; Wüstenhagen et al., 2007). Understanding customer perceptions and particular social demographics and engaging with them effectively is particularly important in early stage live trial programmes, where these will be the first in the UK to experience using hydrogen in their homes.

HyDeploy 2 proposes the first two live trials on a public network of blended hydrogen and natural gas at scale into customers' homes. A full picture of the perceptions of hydrogen in the communities in the proposed trial areas and the social demographics of those communities is not currently available. A full understanding of the perceptions held in these communities and how these related to variables such as education, ethnicity and economic profile is vital for a sensitive and appropriately targeted programme of engagement for the live trials.

Method(s)

The project will use both qualitative and quantitative research methods. The research process is set out below:

1. Literature review of factors affecting adoption of and perceptions toward energy innovation, ensuring the review looks across all energy vectors.
2. Characterise the two areas proposed for the public trials, using the socio-demographic variables found to be most pertinent to the study. This will be accomplished via a desk based study of the areas using 2011 census data, official labour market statistics, indices of deprivation data, and the ONS towns and cities analysis data.
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Scope

The project will characterize the demographics of the proposed trial areas for HyDeploy 2, establishing the socio-demographic variables of interest; and developing full area profiles.

The project will study public perceptions of hydrogen and the opportunities and barriers to its integration in everyday urban life as related to the demographics of the two proposed trial areas for HyDeploy 2.

It is limited to only hydrogen perceptions and only the UK context.

1. <https://www.nomisweb.co.uk>

2. <http://dclgapps.communities.gov.uk/imd/idmap.html>

3. <https://www.ons.gov.uk/peoplepopulationandcommunity/housing/datasets/townsandcitiesanalysis>

References

- McGowan F, Sauter R and Brighton E (2005) Public Opinion on Energy Research: Desk Study for the Research Councils. Sussex Energy Group. Science and Technology Policy Research Unit, University of Sussex.
- Wüstenhagen R, Wolsink M and Bürer MJ (2007) Social acceptance of renewable energy innovation: An introduction to the concept. *Energy Policy* 35(5): 2683–2691. DOI: <https://doi.org/10.1016/j.enpol.2006.12.001>.

Objective(s)

1. To gain a valuable insight into the customer 'perceptions' of hydrogen held by members of a sample of households which is – as far as is possible – representative of the proposed trial areas.
2. To be able to determine which demographic, geographic and / or socio-technical contextual factors, if any, affect these 'perceptions'.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

- Area profile (inc. demographics) for the two proposed HyDeploy 2 trial areas.
- A robust sampling frame for HyDeploy 2 which is representative of the proposed HyDeploy 2 trial areas.
- Statistical survey data and analysis on hydrogen perceptions as related to variables present in the proposed trial areas.
- Research report for partners and to be fed into subsequent customer research on hydrogen perceptions.

Project Partners and External Funding

Total: £63,000

Potential for New Learning

If Hydrogen is to play a role in the future energy system then the range of perceptions held by members of the public, must be understood in order to understand and inform effective end user adoption and the integration of hydrogen into everyday activities.

This provides the first UK academic social research into hydrogen that includes both perceptions and attitudes as well as the possible incorporation of hydrogen into the everyday activities in the home, especially heating and cooking. This can be disseminated beyond the HyDeploy 2 project to inform other hydrogen programs. The research team at Newcastle will seek to publish this research in a peer reviewed journal article to strengthen its profile and standing in the energy research community.

Scale of Project

Regionally focused research for future national application.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL2 Invention and Research

Geographical Area

Data drawn from the Cadent and Northern Gas Networks areas, but applicable to at least 80% of UK networks.

Revenue Allowed for the RIIO Settlement

N/A

Indicative Total NIA Project Expenditure

Total: £63,000

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:

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 project will not develop a financial benefit as such but instead will give an indication to the public's perception and attitudes towards hydrogen which will then be used to ensure subsequent hydrogen projects are delivered with customer and consumer attitudes and perceptions at the fore.

Please provide a calculation of the expected benefits the Solution

N/A

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

N/A

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

N/A

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

All Network Licensees are looking at how low carbon gases can be part of the solution to meet UK 2050 targets. Customer acceptability is a vital component of that work. This research will help to inform customer engagement plan across all Gas Network Licensee gas futures projects. It may also be valuable if smaller levels of blending are supported ahead of the completion of HyDeploy 2.

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

Future role of gas / Customer

- 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.

Cadent/NGN are currently the only GDNs running live network trials for hydrogen through the HyDeploy programme. This research is tied to those trials.

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

There isn't currently any formal academic research into public perceptions on hydrogen as an everyday fuel for cooking/heating. It has not been tried before as hydrogen exploration was in the very early stages for consumer use. This is now the right time to pursue the research as live trials get underway.

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

Hydrogen delivery is an innovation strand and customer perceptions about hydrogen use are outside of core business. It would not

form part of Cadent's general customer work which focuses on the safe and reliable every day delivery of natural gas to consumers.

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

NIA funding is being used due to the degree of uncertainty associated with Hydrogen being used as a future fuel for heating homes. There are various challenges that need to be overcome before realizing this vision and public perceptions is a significant part of this.

This project has been approved by a senior member of staff

Yes