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

Apr 2024

Project Reference Number

NPG_NIA_48

Project Registration

Project Title

Energy Users: Regional Customer Archetypes (EUReCA)

Project Reference Number

NPG_NIA_48

Project Licensee(s)

Northern Powergrid

Project Start

May 2024

Project Duration

0 years and 4 months

Nominated Project Contact(s)

Mary.Black (mary.black@northernpowergrid.com)

Project Budget

£100,000.00

Summary

National Grid recently developed Consumer Building Blocks under NIA2_NGESO026 in conjunction with ERM (Element Energy), leading to publication at LSOA-level of domestic and non-domestic archetypes. These offer opportunities to DNOs to bring greater commonality across the transmission and distribution load models and to incorporate modelling improvements related to domestic and non-domestic responses to flexibility, efficiency, and LCTs. However, to adapt the non-domestic archetypes for DNO use requires incorporation of DNO specific services and considerations, and of the constraints faced by businesses in rural and urban settings. Work is also needed to develop methodologies that add regionality into the domestic archetypes by considering (for example) disposable household incomes, as the NG archetypes include uncontextualised data on household incomes.

Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

Problem Being Solved

The archetypes developed by ERM and the Centre for Sustainable Energy (CSE) for National Grid ESO provide a highly granular snapshot of the customer base in Great Britain, with a significant degree of detail on energy usage habits, which adds context and detail not previously captured in National Grid's annual FES.

However, the behavioural characteristics which are ascribed to those archetypes do not vary by region in the country. The economic reality for householders and businesses differs across regions, and so this project seeks to add value through introducing a locational element to the archetypes. At present, customer counts are presented for each LSOA in the country, but the characteristics of archetype X are the same in Cornwall or Scotland as they are in London. The benefit of this work, therefore, is to develop the existing framework while acknowledging regional context which may have an influence on customer behaviour and low-carbon technology adoption.

Method(s)

Using Northern Powergrid as a “proof of concept” case study for how a DNO can bring the consumer building blocks into DFES, we propose a flexibility focused initial research project for regionalising the non-domestic archetypes which takes as input the flexibility services available to local organisations. For the domestic archetypes a methodology would be developed for calculating varying purchasing power due to the relative cost of living across the country and incorporating this this data into the disaggregation of LCT uptake trends within the region.

Scope

The project will deliver:

- Regional non-domestic and domestic archetypes, in a format similar to that presented by National Grid in their recent project.
- An impact assessment of both sets of archetypes, showing the level of variation between different regions which has been identified by the research.
- Methodology for potential future use cases.
- A report detailing the methodology followed, a summary of results and their impact.

The key variables of importance are:

- For non-domestic archetypes, differences in the distribution of behavioural groups between the national dataset and the regionally specific data (ie rural/urban archetypes)
- For domestic archetypes, the range and distribution of purchasing power seen across archetype groups in different parts of the country.

Objective(s)

The project will aim to:

- Add regional granularity to the behavioural characteristics describing each archetype’s interaction with and use of clean technologies and flexible demand.
- Demonstrate any materiality of regional variations when considering engagement with and adoption of clean technologies and flexibility.
- Build upon an existing framework, to promote commonality in the approaches taken to technology uptake and network load forecasting across the UK’s networks.
- Provide NPg and other networks with the tools to better understand and assist their customer bases and their engagement with decarbonisation and the energy system.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

This project has been assessed as having an overall positive impact on consumers in vulnerable situations. Though the research itself will not have direct impacts upon the network’s customers, the insight provided to NPg could help to better target support for regions of their licence area which are struggling to adopt low-carbon technologies, or those where customers have lower purchasing power and may be closer to fuel poverty. Furthermore, considering regional customer variation in future load modelling can add nuance to forecasts which may help with avoiding future outages and network constraints.

The results taken from the dashboard of the impact assessment tool are shown below.

Overall Project Score: 10/10

Relative Impact Score: 6.8/10

Positive Impact Score: 3.5/10

Negative Impact Score: 0/10

Success Criteria

Delivery of:

- expanded archetypes for both user categories;
- a detailed assessment of the materiality of the findings from the project (i.e. an impact assessment);
- suggestion of methodologies for future implementation, if appropriate.

Project Partners and External Funding

N/A

Potential for New Learning

The benefits to NPg would include evidence around regional variations in archetype distributions, underlining the importance of the DNO's ownership of DFES and network forecasting; an understanding of the barriers local organisations face in adopting NPg specific flexibility offers; and development of data sets and methodologies. The outputs of the project could be used in future to provide insight on regions of the country which may lag behind in the energy transition, allowing focused support to be considered. The process could then be adopted by other DNOs, to introduce understanding of regional differences against the national dataset.

Scale of Project

This is a small scale project. It will develop two regionally-specific case-study I&C archetype distributions (1 rural, 1 urban), demonstrating the variation in behaviour types seen in different geographical contexts across a range of sectors for the NPg area. On the domestic side, the project will produce a national dataset which adds additional regionalised economic context to National Grid's domestic archetypes, giving an indication of purchasing power. Comparisons against the original NGESO dataset will show the materiality of regional variations in the archetypes. A report detailing methodology, research findings, outputs, an impact assessment, and recommendations for future implementation will also be produced.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The analysis for the non-domestic archetypes will consider two specific example local authorities in NPg's licence areas (ideally one urban and one rural). This is intended to act as a proof-of-concept for further such categorization / implementation across Great Britain at-large, if the changes are found to be material.

The domestic analysis will use public datasets on regional disposable income, cost-of-living, wage growth etc to add a regional element to the financial information contained in National Grid's archetypes.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£100,000

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:

This project has the potential to facilitate the energy system transition through improving understanding of the customer base in different regions of the UK, while building on an existing framework used in industry. This could assist with improved modelling of technology uptake, and load forecasting, which are essential components of facilitating the energy transition equally across all parts of the country.

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)

N/A

Please provide a calculation of the expected benefits the Solution

A calculation cannot be provided as this project will carry out research and desktop analysis. However, the guidance produced by this project could facilitate improved regional understandings of future low carbon technology deployment, which becomes increasingly important as DNOs become DSOs, and the way in which individuals and businesses engage with energy use shifts.

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

The guidance produced through this project will be able to be used by all Network operators. The approaches developed for non-domestic customers will be applicable across license areas, and the data for domestic archetypes will cover all of GB by default, and will be usable as-is.

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

As the project will give data and guidance documents as an output, this will not have a significant rollout cost.

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 Guidance developed will be able to be used by all network licensees, as the ESO archetypes cover all of Great Britain. The approaches developed for non-domestic customers will be applicable across license areas, and the data for domestic archetypes will cover all of GB by default.

This could then be used to inform future analysis of low carbon technology uptake, which is fundamental to network forecasting. Similarly, the archetypes could assist with modelling of the engagement with flexibility and efficiency measures, and can provide a unified approach which could be adopted widely in the industry.

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 search of existing projects has shown no unnecessary duplication will take place in the course of this project, to the best of our knowledge, but learning will be taken from all related research activities both with UK and in the wider 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

The Project is innovative as it builds on a recent novel archetyping study by National Grid ESO, and adds further data to those existing outputs. This will provide greater insight into the existing archetypes and potentially increase their usability for regionalised network and decarbonisation analysis.

Relevant Foreground IPR

N/A

Data Access Details

Data will be published at the end of the project, in a manner consistent with the existing customer archetypes published by ESO on which this project will build. A webinar will also be given to aid public dissemination, in which the details of data access will be described for attendees.

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

The project is contributing to the research for transition to a low carbon future which will be applicable and useful for distribution network companies across Great Britain; as such, along with the scale of the studies required, innovation funding is appropriate for this.

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 project studies will identify an approach to incorporating the new archetypes into DFES across networks in the UK license area – in order to standardize and harmonise the modelling approach and interfaces for incorporation of local information, a study of this scale is necessary. Currently there is no framework proposed for incorporating these archetypes into DNO DFES productions.

If individual network licensees created methodologies individually, there would be a disparity between how regionally specific information was being handled in DFES modelling across the country. This introduces risk to ourselves of funding methodological and tool changes that are not industry standard. It also introduces risk to regional stakeholders as they may be faced with different requirements and interfaces in different areas. Unified guidance will reduce this risk by ensuring all network licensees have consistency.

This project has been approved by a senior member of staff

☑ Yes