NIA Project Close Down Report Document

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Date of Submission

Jul 2024

Project Reference Number

NIA2_NGESO026

Project Progress

Project Title

Consumer Building Blocks

Project Reference Number

NIA2_NGESO026

Funding Licensee(s)

NGET - National Grid Electricity Transmission

Project Start Date

November 2022

Project Duration

0 years and 9 months

Nominated Project Contact(s)

James Whiteford, James Kerr

Scope

The project will last approximately nine months with two project partners. CSE will develop archetypes for the domestic sector, while Element Energy will develop archetypes for the I&C sector. This division of labour fits well with the expertise and experience of both organisations.

Objectives

This project is split across multiple working packages, with an initial scoping phase followed by data analysis and archetype development. The objectives are as follows:

- Create two distinct sets of consumer archetypes for the domestic and non-domestic sectors to be used in modelling future energy scenarios on the GB energy system. This will include the raw data as well as archetypes descriptions.
- Create a written report which documents the methodologies, how the archetypes can be applied and how they can be updated for the future.
- Provide a user guidance manual and training for the ESO, networks and other potential users.

Success Criteria

The following will be considered when assessing whether the project is successful:

- The archetypes developed can be applied directly to the FES modelling process
- Relevant stakeholders and project partners from external organisations have received training on how to interpret the archetypes, how to apply them and how to keep them up to date.
- The archetypes will be developed in such a way that they can be easily and quickly adopted within multiple organisations (e.g., via accessible datasets, training and user guidance.
- The project will improve the ESO's and partner organisations' understanding of the types of consumers and the characteristics that drive their behaviour and what this means for their consumption, propensity for change, adoption rates of technology and ability and propensity to engage with time of use tariffs.

Performance Compared to the Original Project Aims, Objectives and Success Criteria

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Project Overview

The Consumer Building Blocks project was launched to develop standardised archetypes for Great Britain's energy consumers, encompassing domestic and non-domestic sectors. These archetypes are designed to help the ESO and network operators better understand current consumer behaviour and predict future changes. This enhanced understanding is vital for detailing energy system requirements and can directly inform the Future Energy Scenario (FES) development. By creating a common language across network operators, the project ensures a shared comprehension of consumer behaviour, aiding in strategic network development and planning.

WP0: Project Coordination & Stakeholder Liaison

This work package aimed to ensure a coordinated approach to stakeholder engagement and project delivery. The ESO and project partner, CSE, worked together to manage stakeholder interactions and align engagement with other ESO programs. Regular consortium meetings and quarterly external updates kept stakeholders informed and involved. This engagement strategy was crucial for aligning the project's scope and activities with the needs and expectations of various stakeholders, including transmission owners, network operators, and suppliers.

The effective coordination between the ESO, CSE, and Element Energy teams facilitated the integration of project activities with existing FES stakeholder engagement processes. This close collaboration ensured that the project outputs were relevant and could be effectively utilised by stakeholders, enhancing their understanding and application of the archetypes.

WP1: Scoping

The scoping phase was essential for establishing the foundation of the archetype development. This phase involved a comprehensive review of existing archetype research and segmentation methods, identifying key users and use cases, and characterising system and social changes. By engaging future users, the project ensured that the archetypes would be adaptable to evolving energy system dynamics and user needs.

Key outputs from this phase included a detailed review of existing research, documented user needs, and a clear summary of current assumptions and their integration into the archetypes' trajectories. These outputs provided a robust basis for developing archetypes that are future-proof and aligned with strategic objectives. The technical specifications for the archetypes' format and potential changes to the FES further ensured the project's relevance and applicability.

WP2: Data Analysis & Curation

In this phase, the project team focused on reviewing the suitability of existing datasets and addressing gaps to create robust input datasets for segmentation. Despite challenges in accessing data for large industrial users, a combination of available sources was used to develop comprehensive datasets. Stakeholder input was critical in shaping these datasets, ensuring their accuracy and relevance.

The successful completion of domestic consumer archetype input datasets and I&C archetype input datasets provided a strong foundation for the next phase. By curating robust datasets, the project ensured that the archetypes would be based on accurate and comprehensive data, enhancing their utility for various applications, from FES modelling to network planning.

WP3: Segmentation & Archetype Development

This phase involved developing robust segmentation methods, archetypes, and change trajectories that integrate into current FES modelling. The project team engaged with stakeholders throughout this phase, ensuring that the archetypes were rigorously tested and validated. Technical specifications and descriptions for domestic and industrial/commercial (I&C) sectors were developed, ensuring applicability across different consumer segments.

Stakeholder and ESO workshops were crucial in validating the archetypes and ensuring their relevance. Engaging with a wide range of stakeholders ensured that the archetypes were robust and widely accepted. The completion of technical specifications and descriptions for both domestic and I&C archetypes, along with stakeholder workshops, provided a comprehensive foundation for the final outputs, ensuring their usefulness across various applications.

WP4: Outputs, User Guidance & Training

The final work package focused on delivering the completed archetypes and providing comprehensive user guidance and training.

Final versions of all outputs, including detailed archetype descriptions and datasets, were signed off. A project report, presentations, and a user guidance manual were produced to support the ESO, network companies, and other potential users in interpreting and applying the archetypes.
Training sessions were conducted to ensure stakeholders could effectively use the archetypes and keep them current. The user guidance manual provided detailed instructions on interpreting and applying the archetypes, ensuring their easy and quick adoption across multiple organisations. This comprehensive support ensured that the archetypes would have a significant impact and be effectively utilised in various applications.

Summary of Project Outputs

The Consumer Building Blocks project successfully developed standardised consumer archetypes that can be directly applied to FES modelling and other energy planning activities. The project remained within budget and delivered all expected outputs, including comprehensive datasets, technical specifications, and user guidance. The engagement and training provided to stakeholders ensured that the archetypes would be widely adopted and effectively used.
Key successes of the project include the creation of robust and future-proof archetypes, comprehensive stakeholder engagement, and the development of detailed user guidance and training materials. The project's outputs have enhanced the understanding of consumer behaviours, driving factors, and engagement levels, which are critical for future energy system planning and development. By providing a common language and comprehensive tools for understanding consumer behaviour, the project has significantly improved the ability of the ESO and network operators to plan for and manage the evolving energy landscape.

Required Modifications to the Planned Approach During the Course of the Project

No changes were required.

Lessons Learnt for Future Projects

Learning points from the technical analysis phase of the project:

- Different approaches have been used to develop the domestic and non-domestic archetypes due to both the nature of the consumers and also due to the different datasets that are available. Data for large industrial users was difficult to obtain. A combination of available data was used to develop the non domestic consumer archetypes.
- The main data source used for the domestic consumer archetypes was the SERL (Smart Energy Research Lab) – due to the restricted nature of this data it has been challenging both to access the data and perform analysis on it.
- Further insight could be gathered from a bespoke survey from consumers that could be used to derive important inputs into the modelling that is performed for the Future Energy Scenarios.

Note: The following sections are only required for those projects which have been completed since 1st April 2013, or since the previous Project Progress information was reported.

The Outcomes of the Project

The project has developed understanding of the following, which could be used and applied in future projects:

- The types of consumers and the characteristics that drive their behaviour;
- What this means for their consumption, appetite for change, adoption rates of technology and ability and propensity to engage with time of use tariffs;
- Whether their engagement will be proactive or passive;
- The boundaries within which they would find flexing their demand acceptable;
- Their needs and what drives their decision making (whether it be financial reward or engagement in climate change).
- The proportions that make up each consumer archetype and how this varies geographically;
- How they may engage and with whom;
- What would cause a consumer to move between archetypes.

Review of benefits case

The following were identified as success criteria for the completion of the project. These are anticipated to still be met upon completion of the project.

- The archetypes developed can be applied directly to the FES modelling process
- Relevant stakeholders and project partners from external organisations have received training on how to interpret the archetypes,

how to apply them and how to keep them up to date.

- The archetypes will be developed in such a way that they can be easily and quickly adopted within multiple organisations (e.g., via accessible datasets, training and user guidance.)

The project will improve the ESO's and partner organisations' understanding of the types of consumers and the characteristics that drive their behaviour and what this means for their consumption, propensity for change, adoption rates of technology and ability and propensity to engage with time of use tariffs

Next steps

Plan to keep the archetypes up to date and how to apply them directly to future modelling

Dissemination

Four expert group sessions have been held with relevant stakeholders across industry representing gas and electricity network companies, Ofgem, DESNZ and industrial & commercial consumers via Energy UK. The session materials have been disseminated and recordings shared. Further sessions have been delivered to finalise the domestic archetypes and to deliver training to partner organisations.

Data Access

Details on how network or consumption data arising in the course of NIA funded projects can be requested by interested parties, and the terms on which such data will be made available by National Grid can be found in our publicly available "Data sharing policy related to NIC/NIA projects" and www.nationalgrideso.com/innovation.

National Grid Electricity System Operator already publishes much of the data arising from our NIC/NIA projects at www.smarternetworks.org. You may wish to check this website before making an application under this policy, in

Foreground IPR

The following Foreground IPR will be generated from the project:

- Archetype descriptions
- Archetype datasets
- Project report & presentation
- User Guidance manual & training
- Scoping document on future FES directions reflecting on project outputs and stakeholder engagement outcomes

Planned Implementation

Further work is ongoing to test the outputs' integration within current and future modelling plans for the Future Energy Scenarios. Potential areas for integration that are being investigated are:

- The industrial and commercial sectors by using the archetypes to inform how sectors may evolve towards low carbon technologies and how engaged these sectors may be with providing demand-side services.
- Transport: the archetypes could be used to understand how adoption rates for low carbon vehicles vary. Further to this the information can be used to model use of the vehicles and charging options within different archetypes along with engagement in smart charging or V2G technologies.
- Residential and space heating: The archetypes can be used to refine the building archetype information within our spatial heat and appliances models to better understand how willing different archetypes are to adopt low carbon heat sources or more efficient appliances and how they may operate these.
- Further work is also being explored to apply learnings and outputs from the recent outputs of the Demand Flexibility Service to the archetypes.

Other Comments

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