SIF Project Registration

Date of Submission

Jul 2023

Project Reference Number

10061292

Project Registration

Project Title

Proportional Investment Of Networks in Energy Efficiency Retrofit (PIONEER)

Project Reference Number

10061292

Project Licensee(s)

National Grid Electricity Distribution

Project Start

April 2023

Project Duration

3 Months

Nominated Project Contact(s)

Jacob Lynch

Project Budget

£143,180.00

Project Summary

The proposed project is linked to Innovation Challenge 4. The Climate Change Committee (CCC) estimate that EE has the potential to save up to £6bn a year across the system, yet rollout of thermal EE to date has been poor due to the lack of a business case.

The energy network innovation involved

1. is in demonstrating the real-life network impact of installation of additional thermal EE measures in domestic dwellings to mitigate load growth from electrification of heat
2. Developing and trialing commercial models by which the DNOs can fund the beneficial deployment of additional EE measures on their networks.
3. Integration of these novel commercial models with the DNO's current procedures for managing constrained areas of the network

The project will be delivered by a consortium of:

1. National Grid Electricity Distribution -
2. Carbon Trust - an independent company with a mission to accelerate the move to a sustainable, low-carbon economy. They bring extensive experience in designing and managing relevant innovation programmes, including DEFENDER, BEIS' Heat Pump Ready programme and the Green Homes Finance Accelerator, and in implementation including expertise in building audits and retrofit and local area energy planning.
3. Frontier Economics - one of the largest Economic Consultancies in Europe, with Energy its largest sector specialism. Frontier worked with the CCC to develop pathways for heat pump take up, and modelled the roll-out of low-carbon heating and building retrofits for the National Infrastructure Commission. Frontier is currently working with NGED and Carbon Trust on DEFENDER.
4. West of England Combined Authority
5. Devon County Council
6. South West Energy Hub

It will be supported by an advisory panel of Energiesprong and Wadebridge Renewable Energy Network.

We expect additional project partners for Alpha and Beta phases, once further details of the demonstration location and commercial models to be tested have been defined.

The users of the innovation will be

- Homeowners and landlords
- local authorities
- EE retrofit providers.

Preceding Projects

NIA_WPD_065 - Demand Forecasting Encapsulating Domestic Efficiency Retrofits (DEFENDER)

Third Party Collaborators

Carbon Trust

Frontier Economics

West of England Combined Authority

Devon County Council

South West Energy Hub

Problem Being Solved

The overall aim of PIONEER was to develop commercial models which DNOs could use to bring forward thermal efficiency measures as a cost-effective alternative to reinforcement, to enable the network to handle greater volumes of LCTs. Doing so would help networks meet SIF challenge 3 (accelerating decarbonisation of major energy demands) at lowest cost. The Discovery phase focused on designing the types of intervention which could be trialled, and where such trials should be held for maximum impact.

Project Approaches And Desired Outcomes

The Big Idea

The project aims to develop commercial models by which the DNOs can provide funding for thermal energy efficiency (EE) measures and to demonstrate through pre and post retrofit monitoring the impact these measures have on network loads.

Innovation Justification

The CCC estimate that EE has the potential to save up to £6bn a year across the system. A proportion of the estimated system cost savings is likely to benefit DNOs through avoided reinforcement and flexibility procurement. To address this, Ofgem have implemented a new license condition, expecting DNOs to consider flexibility measures, including EE, as an alternative to reinforcement and work with local partners to upgrade the efficiency of buildings.

Currently no market mechanisms exist that translate the potential network cost savings into EE funding. This project's objectives are to develop novel commercial models for DNOs to unlock or bring forward additional EE deployment, proportional to their cost savings. EE investment has a very different cost profile to flexibility procurement, with different financial and stakeholder risks involved. This includes higher sunk capital costs and greater uncertainty of efficacy.

Through the DEFENDER NIA project, NGED have developed tools that allow them to assess the impact that EE has on reinforcement and flexibility procurement in locations across their network and has identified the network characteristics where EE is likely to be most cost effective. This project will tackle the remaining gaps in the role of the DNO in funding EE measures, including:

- Validation of the modelled outcomes of EE measures through pre and post metering of installed EE measures in different house types
- Understanding of the homeowner/landlord customer journeys of heat pump procurement and key touch points in influencing decision making on EE
- Understanding of the funding landscape for EE measures and commercial models for EE retrofit providers
- the extent to which EE will be deployed in the absence of DNO intervention.

The counterfactuals to funding EE measures are either network reinforcement or flexibility procurement. In some areas of the network, DNO funding could result in increased deployment of EE measures and consequently significant deferral of network reinforcement or reduced flexibility procurement. This results in more cost-effective network operation and lower carbon emissions.

Ultimately, our goal is BaU funding of EE measures alongside the counterfactuals to achieve cost effective network operation. However, innovation is still required to identify the best way to do this to maximise impact, especially given findings of previous innovation projects, which identify that the value of EE measures to the DNO is likely to be only up to low £100s per dwelling. This project will work with stakeholders across the value chain to make funding targeted and easily accessible.

Project Plans And Milestones

Project Plan And Milestones

- **WP1: Scoping of further NGED tool development required to longlist locations and support business as usual funding of thermal EE measures,** for example a GIS interface to enable rapid assessment of multiple areas, integrating flexibility solutions into the DEFENDER load profiling tool and improving domestic load forecasting in the DNOA process. [Frontier Economics led]
- **WP2: Initial longlisting of potential demonstrator locations** using the tools developed in DEFENDER and in WP1 to identify areas of the network with high levels of benefit from EE deployment and understand the types of homes present in these areas. Initial focus will be on the areas covered by Devon County Council and WECA. This will include considerations such as homeownership and support of vulnerable consumers. [Frontier Economics led]
- **WP3: Identifying existing and potential funding strategies for EE retrofit/specific schemes that are running** through a desk top review supplemented with research calls with industry experts to further understand the details of the most relevant schemes. This will be utilised in the Alpha phase in ensuring funding from DNOs is stackable with other funding schemes available in the demonstration area. [Carbon Trust led]
- **WP4: Initial identification of routes to impact EE uptake** though literature review and research calls, including with international examples such as the US and ongoing innovation programmes such as the Green Homes Finance Accelerator. This will be used in Alpha to build commercial models targeting the points in the value chain where the additional DNO funding can have maximum impact. [Carbon Trust led]
- **WP5: Development of Alpha plan (quantifying risk)** This is the main output from the Discovery Phase. It will be led by NGED, with input from all Project Partners and will also include conversations with new Project Partners that will be required in the Alpha stage, such as EE retrofit providers and metering experts. These discussions have been delayed from ideation to the discovery phase to account for the uncertainty in geographic area of focus, which influences the interest and ability of EE retrofit providers to participate. Additionally, we intend to collaborate with Innovate UK on identifying funding strategies for the EE measures to be deployed in the demonstrator, as SIF funding is limited to network infrastructure only.[NGED led]
- **WP6: Project coordination** NGED will lead the coordination and management of the Discovery Phase, organising meetings, ensuring delivery times met completing monitoring and reporting etc

Further detail can be found in Appendix 1.

Route To Market

Throughout DEFENDER we have been collaborating closely with members of the NGED teams that lead BaU activities on load forecasting and options assessments. We will continue this approach during PIONEER, including expanding our engagement to the DSO procurement team and ensuring a relevant project sponsor is in place to guide outputs to being deployed across the network.

Our draft findings in DEFENDER show that the benefits to the network of installing EE measures in constrained areas is in the order of £100-£200 per house. The exact levels of benefit in an area will be assessed alongside network reinforcement and flexibility procurement, providing a level playing field across these solutions.

Once implemented, the funding will be available to all EE retrofit providers, homeowners and landlords of properties in properties where greater levels of EE benefit the network. This ensures no distortions in competitive markets, allowing homeowners and landlords to choose the EE provider of their choice. Progressive funding strategies to target support to more vulnerable customers will be considered.

The EE measures themselves are well established and not the focus of our innovation activities. The innovation in our solution is around the role of the DNO in funding these measures and the ability to stack sources of funding with a DNO contribution. NGED, WECA and Devon County Council are therefore well placed in leading the implementation of our developed approaches into business as usual.

The primary customer segment for our innovation is domestic properties in areas of network constraint and the EE installers whose business this innovation may support.

Funding EE could be a lower cost solution for network operators than flexibility procurement or network reinforcement, leading to lower network operation costs and hence lower customer network charges. For customers directly benefiting from DNO funding of EE deployment, these measures will result in higher comfort levels and reduced energy bills. EE results in lower customer demand and hence lower carbon emissions from electricity generation and network losses and non-energy benefits such as improved health.

As a result of this project, NGED will have a greater understanding of how they can most impactfully fund EE deployment to benefit their networks and customers more broadly, with these commercial models able to move into BaU deployment. This funding could be in the form of upfront capital or as an ongoing payment. The scheme will have some operating costs associated with it for NGED. The value NGED receives from increased EE deployment is insufficient to fully cover the cost of these measures. The remaining funding will need to be covered from local or national government, novel financing solutions from EE providers or directly from homeowners and landlords.

Costs

Total Project Costs

143180

SIF Funding

126662

This project has been approved by a senior member of staff

☑ Yes