SIF Discovery Round 2 Project Registration

Date of Submission

May 2023

Project Reference Number

10061358

Project Registration

Project Title

Guidelight

Project Reference Number

10061358

Project Licensee(s)

UK Power Networks

Project Start

Apr 2023

Project Duration

3 Months

Nominated Project Contact(s)

innovation@ukpowernetworks.co.uk

Project Budget

£140,720.00

Funding Mechanism

SIF Discovery - Round 2

SIF Funding

£119,628.00

Strategy Theme

Supporting consumers in vulnerable situations

Challenge Area

Supporting a just energy transition

Lead Sector

Electricity Distribution

Other Related Sectors

Funding Licensees

Lead Funding Licensee

UKPN - London Power Networks Plc

Collaborating Networks

UK Power Networks

Technology Areas

Community Schemes, Poverty, Stakeholder Engagement

Equality, Diversity And InclusionSurvey

Yes

Project Summary

The project addresses Challenge 1 'Supporting a Just Transition' by working with low-income households and those in vulnerable circumstances to ensure they are not left behind in the energy transition, as well as UK Power Networks' RIIO-ED2 commitments to better identify and support financially vulnerable consumers. It will result in energy network innovation associated with:

- The connections process and how DNOs could use this to improve asset performance and widen consumer participation; and
- The development of mechanisms to identify poor Low Carbon Technology (LCT) performance that risk financial penalties to households and dis-benefits to the network.

The partners bring the following experience:

- UK Power Networks has delivered multiple initiatives to better identify, understand, and support consumers in vulnerable circumstances, and recently made the strategic decision to locate the Consumer Vulnerability team within the innovation function, to drive more innovative projects.
- The Centre for Sustainable Energy (CSE) supports low-income households with their energy needs and low carbon retrofit; and delivers digital innovation tools to help consumers engage with the energy market.
- The Sustainable Energy Research Group's (University of Southampton) work uses integrated engineering and social research approaches to unravel the socio-technical factors affecting home energy system outcomes.
- Sedgemoor District Council has set-up Somerset Independent Plus, a vehicle to accelerate housing improvements and has delivered programmes installing LCTs for low-income and fuel-poor residents.
- Portsmouth City Council has some of the highest rates of fuel poverty in the South of England. Their own monitoring suggests that some LCT installations achieve sub-optimal performance, potentially increasing both network load and customer/council energy costs.
- Hackney Council is an inner-city borough seeking innovate solutions for smart local energy including a local Green Homes Programme and Community Energy Fund.

The project meets potential user needs as follows:

- DNOs could develop innovative solutions/propositions to identify and reduce the performance gap for grant-funded LCTs, enabling delivery of energy demand reduction and demand flexibility solutions.
- Suppliers, aggregators and tech providers will have insight into how the socio-technical performance gap affects customer uptake and use, enabling development of new consumer offerings.
- LAs/housing providers will achieve more effective use of grants guiding householders towards smarter energy use, reducing bills.
- Low-income and vulnerable customers will gain better access to the different LCTs available, insight into their smart capabilities, understand how to effectively use assets, increase comfort and reduce energy bills. They will see better availability of smart products that help them optimise their LCTs.

Project Description

Local authority retrofit programmes are rapidly installing low carbon technologies (LCTs) such as heat pumps, batteries, solar panels, smart controls in low-income households and those in vulnerable circumstances. These households are less likely to switch to innovative tariffs or use digital tools to optimise their LCT use. Research has shown this is due to factors such as low energy literacy, digital exclusion, financial constraints, as well as non-inclusive product and service design (such as excluding pre-payment meter users from the most innovative tariffs available). There is a risk of creating a 'socio-technical' performance gap through retrofit programmes if the complex array of factors that contribute to asset optimisation and demand management are not addressed. For example, households who have had a heat pump installed by their landlord with little support in achieving a high coefficient of performance and who lack digital confidence to opt into an aggregation service, are likely to see higher bills and reduced comfort. In addition, these households may then add to network constraints rather than mitigate them if they are not appropriately supported and guided.

In response DNOs need to: understand the gap between expected LCT performance and actual in-use performance for these grant-funded LCTs; establish the extent that future demand management programmes requiring these assets will be affected; and develop support interventions needed by installers and customers to reduce this socio-technical performance gap, enhance customer benefit, and increase asset availability for demand side response (DSR).

CSE's research programme 'Smart and Fair' has developed the 'Smart Energy Capabilities Lens' (CSE, 20201), identifying the variety of factors that affect a household's ability to participate in and benefit from the smart energy transition. This project will use this Lens and the Energy Cultures Framework (Stephenson et al. 20102) to identify the factors that affect the technical performance and future DSR availability of LCTs in low-income households and those in vulnerable circumstances.

The project will look at network connections, retrofit installations and households' usage patterns of heat pumps, PV and batteries and the types of interventions that could build households' Smart Energy Capabilities. This evidence will be used in Alpha phase to develop and lab test potential pilot services and digital and non-digital tools. Expected innovations will include information tools and guidance on LCT use, accessible digital dashboards and low-cost monitoring services for households and stakeholders including local

authorities, retrofit contractors, LCT designers, manufacturers & installers, and technology innovators.

Third Party Collaborators

Centre for Sustainable Energy

Sedgemoor District Council

London Borough of Hackney

Nominated Contact Email Address(es)

innovation@ukpowernetworks.co.uk

Project Description And Benefits

Applicants Location (not scored)

- UK Power Networks: 237 Southwark Bridge Road, London SE1 6NP
- Centre for Sustainable Energy: St James Court, St James Parade, Bristol, BS1 3LH
- University of Southampton: Faculty of Engineering & Physical Sciences, University of Southampton, University Road, Southampton, SO17 1BJ, United Kingdom
- Sedgemoor District Council: Somerset Independence Plus, Unit 17 Knights Road, Chelston Business Park, Wellington, TA21 9JH
- Hackney Council: 72 Wilton Way Kingsland, London E8 1BG
- Portsmouth City Council: Civic Offices, Guildhall Square Portsmouth, PO1 2AL, Hampshire, United Kingdom.

Project Short Description (not scored)

Low-income and vulnerable consumers receive grant funded LCTs through local authority retrofit schemes, but without supporting households to switch tariffs or using digital optimisation tools, retrofit schemes risk creating a socio-technical performance gap that this project will evidence and address through a range of capability-based interventions that are tailored to those in vulnerable circumstances.

Video description

https://www.youtube.com/watch?v=uzZonmb4UOU&list=PLrMOhOrmeR6ldr-EVoT8ABGhTCxgyBKqs&index=5

Innovation justification

Investment in grant-funded LCTs is ramping up at pace. These schemes target vulnerable consumers (e.g. HUGS, LADS) reducing some financial barriers to participating in the energy transition. However, these households are less likely to adopt time of use tariffs or use digital technologies to optimise their energy use. Without support and guidance to become smart energy users, low-income and vulnerable households may be financially penalised for their participation in the energy transition, resulting in them adding to network constraints rather than mitigate them. This project delivers the social and digital innovation needed to enable asset optimisation and deliver value to households and the energy system.

CSE has developed the Smart Energy Capability Lens which captures the range of non-technical factors that affect asset performance, such as a household's digital confidence, their energy social capital, domestic routines, tenure, ability to bear financial risk. However, this conceptual framework needs to be proven empirically and demonstrate how these factors combine to affect asset performance. This project aims to quantify the socio-technical potential and reduce the socio-technical performance gap, which requires the following innovations:

*Novel methods to capture households' experiences and expectations and link these to asset performance;

*Novel interventions that build smart capabilities to reduce the socio-technical performance gap;

*Novel approaches to monitoring and modelling that account for socio-technical potential and improve network planning; and

*Novel approaches for unlocking energy flexibility from these households through existing or novel flexibility services.

Rich data on households' understanding and use of LCTs is scant, and we lack insight into specific experiences and expectations these households have of the technologies being installed in their homes. Therefore, we do not know whether LCTs are performing as engineered and if the consumers or the network are as expected. Our limited knowledge is because of the challenges conducting the required research with these households. The project partners have experience with and routes to grant-funded schemes installing LCTs as part of retrofit works. This will enable us to pilot engagement and monitoring techniques with hard-to-reach households.

Closing the socio-technical performance gap means more cost-effective deployment of LCTs and networks will be better able to innovate forms of support for low income and vulnerable households.

This project cannot be funded elsewhere due to the need for collaboration across various sectors, the sensitivities with working with vulnerable households and the need for interventions to be easily scaled nationally across all networks.

Benefits Part 1

Financial - cost savings per annum on energy bills for consumers
Financial - future reductions in the cost of operating the network
New to market – products, processes, and services
Revenues - improved access to revenues for users of network services

Benefits Part 2

Financial -- future reductions in the cost of operating the network

- Target output: Reduction in the cost of network reinforcement
- Metric: Model showing what reinforcement would be required if interventions were not applied.
- Justification for target output: Better management of domestic LCTs will reduce the net impact of them on the grid, and drive consumption away from peak load, thus preventing or deferring the need for reinforcement.
- Achieve by: end of beta phase.

Financial -- cost savings per annum on energy bills for consumers

- Target output: A reduction of consumers' bills
- Metric: Households annual energy bills
- Justification for target output: through appropriate interventions we expect to see improvements in the coefficient of performance (COP) for air source heat pumps, kWh of solar PV output used on site, battery storage, and engagement with tariff switching and domestic flexibility services
- Achieve by: end of beta Phase

Revenues -- improved access to revenues for users of network services

- Target output: An increase in low-income households participating in flexibility services and offerings
- Metric: Number of households participating in the flexibility services after trialling the interventions compared to the number participating prior to the interventions.
- Justification for target output: Project will aim to provide consumers with the ability to better access existing services and help create new services more targeted for their needs, thus increasing participation.
- Achieve by: End of beta phase

New to market -- products, processes, and services

- The project will track how the innovations and open access framework lead to new processes and products that target or include low-income households and consumers in vulnerable circumstances.

Additional metrics

- Social inclusion -- we will document the diversity of households engaged
- Smart Energy Capabilities -- we will develop a metric for assessing Smart Energy Capabilities and tracking improvements per household

In addition, the project will quantify:

- The socio-technical performance gap of grant funded LCTs
- The impact on the socio-technical performance gap of the innovations (i.e. social innovations during install and hand over to tenant, digital and social innovation to monitor performance gap and deliver actionable insight to the appropriate party (e.g. landlord, tenant, DNO).

Project Plans And Milestones

Project Plan and Milestones

WP1 Project management (CSE):

- CSE will project manage the Discovery phase, co-ordinate partner organisations, own the risk register, fulfil all reporting requirements.
- Success criteria: Successful completion of the Discovery Phase.
- SIF Funding: £40,390

WP2 Engagement (CSE):

- This WP will develop qualitative social research methods that can evidence low income and vulnerable households' experiences of retrofit and identify appropriate intervention points for optimising LCT asset use.
- Success criteria: Completion of a presentation on qual research tools and a report on retrofit engagement.
- SIF Funding: £21,610

WP3 Monitoring (University of Southampton):

- This WP will review options for monitoring the performance of LCTs systems under the Alpha and Beta Phase interventions to be deployed in field sites.
- Success criteria: Creation of a report on recommended monitoring arrangements for intervention testing in Alpha and Beta Phases.
- SIF funding: £37,823

WP4 Interventions (CSE):

- This WP will review options for interventions to be piloted and scaled in the Alpha and Beta Phases. Building on WP1 insights a realist review of current evidence, and partner input, this WP will examine at which point in a retrofit an intervention is most useful/sensible and what type of outcomes are produced by different interventions with different types of households.
- Success Criteria: Report on recommended interventions to prototype in Alpha Phase and deploy in Beta.
- SIF funding: £19,805

The project has identified the following risk that could impact Discovery Phase:

- Difficulty in identifying and recruiting households to directly participate and engage with the research. This will be mitigated by using the partners' networks to appropriately and sensitively identify and engage with households to support the research.
- Local authority and schemes engaged with the Discovery Phase research are not fully representative of the range of grant-funded LCT schemes being delivered -- therefore interventions and solutions developed do not meet all needs. This will be mitigated by including desk-based research to capture schemes and experiences not just limited to partners. We have received commitments from LBs Islington, Hackney, and Newham to participate in the Discovery Phase.

The project will use a standard risk management approach where the Risk Register generated will be regularly maintained and reviewed by the project partners. Any changes to existing risks or the identification of new risks will be appropriately managed in line with their probability and risk.

Regulatory Barriers (not scored)

There are no expected regulatory barriers hindering delivery of the Discovery, Alpha or Beta Phases of the project.

The following steps will be taken to identify and engage with consumers, complying with requirements for getting informed consent:

1. Recruit households by working with trusted parties delivering retrofit schemes, offering them the option of participating in the project.
2. Assess eligibility: CSE's smart energy capabilities assessment will be used to gauge household capacity to participate and benefit from the project.
3. Gain informed consent: If interested and able to benefit from the project, households will be taken through an informed consent process which details the purpose of the project, the steps involved, and what will happen to their data during the project and after it ends. All personal data will be treated in accordance with data privacy laws. Only anonymised data about participating households will be shared with UK Power Networks.
4. Home visits: home visits will be carried out by CSE or partner staff who are specialists in retrofit, advice, or research. All staff will

comply with organisational standards (e.g. DBS checks) and research ethics

Approach to creating evidence to influence future policy and regulations

The project will improve the evidence base on LCT performance, flexibility assets and ability for demand management. This evidence will be shared with DNOs and NG ESO to improve the assumptions used in future system planning (e.g. DFES & FES), leading to more accurate predictions of the outcomes of current policy and therefore inform future policy needs. CSE is currently producing domestic archetypes for NG ESO for FES and recognise the need for a stronger evidence base on the uptake, and performance of LCTs and flex assets across the domestic sector.

Local authorities and scheme delivery partners will also have a better understanding of the packages of support or interventions that need to accompany installation of LCTs to achieve climate targets and can take this into account for local area energy planning and local policy.

By involving BEIS, Ofgem and other stakeholders on the project steering group and openly publishing the research findings, we will ensure the evidence can inform the design of future housing retrofit policies and potentially be fed into future scheme requirements (e.g. ECO or Government-funded programmes).

The project does not require a derogation or exemption from any project-related regulatory requirement either at Discovery, Alpha or Beta stages.

Commercials

Route To Market

Alpha Phase would pilot support interventions in collaboration with selected local authorities, which would be scaled during Beta Phase. The project will engage with several stakeholders including technology providers, flexibility service providers, local authorities, who will provide a direct route to market for the techno-social innovations that are expected to emerge at Alpha and Beta Phase.

This project aims to to develop a framework of interventions, which will be developed by not-for-profit actors (CSE/Southampton) and be published as an open access resource for retrofit planners, energy researchers and inclusive tech innovators who will be able to use it to think about service design. Our framework will evidence how to best engage a much broader range of consumers and indicate new market segments currently underserved by commercial actors. This open-source framework can be used by those developing commercial LCT products to better consider the needs of low-income households and consumers in vulnerable circumstances, creating more accessible products within the market.

New research tools will be used in Alpha and Beta to produce evidence. The improved network planning that comes from more accurate predictions about LCT use and DSR uptake can be used by any network.

The implementation of the solution will be divided between the different parties, based on the type of intervention identified. UK Power Networks will implement the associated DNO process changes or technical changes required to deliver relevant interventions. CSE will be the main driver for implementing the interventions identified in conjunction with local authorities and other charities. Exact interventions will be identified during Discovery Phase and trialled during Alpha and Beta Phase.

The exact solutions that will implemented will be defined during Discovery Phase. We envision the primary customers would be:

- Other DNOs
- Local Authorities
- Companies providing LCTs to local authorities on the public market

The customer value proposition and associated business case, aligning with the net benefits as outlined in the Benefits Part 1 and 2 and project plan and milestones questions, are:

- More efficient use of LCTs installed within their homes reducing energy bills;
- Enabling better access to services that could reduce energy bills; and
- Helping ensure LCTs are accessible to all.

The funding strategy beyond Beta Phase will be determined once the interventions are developed. The expectations are that implementation will be privately funded by the companies choosing to implement the solution, and that any interventions would not incur significant implementation costs.

Intellectual property rights (not scored)

The IPR arrangements for this project will be in line with the terms set in the SIF Governance Document Chapter 9 and the project participants agree to comply with the default IPR condition.

IPR arrangements will be laid out in a partnership agreement as the contract start, which will define rights over the foreground intellectual property developed in the project and associated background IP. The expectation is that all parties will retain their Background IP but any IP resulting from the project would be jointly owned by the parties that have developed it (i.e. the lead partner and main research and delivery parties -- CSE, University of Southampton and UK Power Networks). Other supporting partners (local authority partners) would be issued with a royalty-free perpetual license to use the project outputs and any required IP (project or Background) for their own local scheme purposes. Any commercial exploitation of the resulting IP would be determined jointly by agreement between CSE, University of Southampton and UK Power Networks.

Costs and value for money

Total project cost - £140,720

- UK Power Networks - £14,750
- Centre for Sustainable Energy - £58,900
- University of Southampton - £56,270

- Sedgemoor District Council - £3,600
- Portsmouth City Council - £3,600
- London Borough of Hackney - £3,600

The following financial contributions will be provided, which exceeds the minimum 10% compulsory contribution, highlighting commitment from the project partners and value for money for customers:

- UK Power Networks -- £13,292
- Centre for Sustainable Energy - £1,800
- Sedgemoor District Council - £3,000
- London Borough of Hackney - £3,000

Total SIF funding - £119,628, which is divided between the partners are follows:

- UK Power Networks -- £1,458
- Centre for Sustainable Energy - £57,100
- University of Southampton - £56,270
- Sedgemoor District Council - £600
- Portsmouth City Council - £3,600
- London Borough of Hackney - £600

This project does not incur or require any subcontractor costs.

This project will provide value for money because:

- The project concept has been developed by CSE working with the University of Southampton and draws directly on the learning, IP and assets developed through CSE's Smart & Fair research programme and the university's work through the CREDS and SAVE research programmes.
- Both organisations are non-profit making. CSE is a registered charity and has no core funding -- all its income relates to the projects and services it delivers.
- Neither organisation will financially benefit from the results of this project; any innovations which emerge will benefit the energy network companies, and any parties offering low carbon technology solutions or flexibility services.
- Considerable investment is being made across industry and government in reworking energy market regulations, developing new flexibility markets, and innovating products and services to deliver a more flexible and lower carbon energy system. This project widens the consumers who can participate in these new markets and therefore provides value for money, by reducing barriers and unlocking more of the expected consumer and network benefits.

This project represents considerable innovation and potential to deliver value for money (if delivered through to Beta Phase) through realising significant financial consumer and network benefits associated with enabling low carbon technologies to achieve their full potential. The total market for flexibility services for GB, is estimated to be worth c. £10billion (BEIS/Ofgem Smart Systems and Flexibility Plan, 2021) and this will only be fully realised if barriers are lifted to low income and vulnerable consumers engaging and benefiting.

Document Upload

Documents Uploaded Where Applicable

Yes

Documents:

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SIF Round 2 Discovery - Guidelight End of phase (for upload).pdf

SIF Round 2 Discovery - Guidelight Show and Tell (for upload).pdf

This project has been approved by a senior member of staff

☑ Yes