SIF Round 3 Project Registration

Date of Submission

May 2024

Project Reference Number

10061354

Initial Project Details

Project Title

KnowMyFlex

Project Contact

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Challenge Area

Whole system network planning and utilisation to facilitate faster and cheaper network transformation and asset rollout

Strategy Theme

Flexibility and commercial evolution

Lead Sector

Electricity Distribution

Other Related Sectors

Electricity Transmission

Project Start Date

01/03/2024

Project Duration (Months)

3

Lead Funding Licensee

UKPN - London Power Networks Plc

Funding Mechanism

SIF Discovery - Round 3

Collaborating Networks

UK Power Networks

Technology Areas

Active Network Management

Asset Management

Heat Pumps

Low Carbon Generation

LV & 11kV Networks

Modelling

Distributed Generation

Electric Vehicles

Photovoltaics

Stakeholder Engagement

Project Summary

Energy flexibility is essential to transforming to a Net-Zero energy system. For customers adopting low carbon technologies, smart management of these flexible assets will empower them to use less energy, reduce bills, and make the most of low carbon energy.

KnowMyFlex proposes to create Energy Flexibility Certificates – similar to EPC ratings – to provide a centralised view of the existing and future flexibility potential of homes and buildings – to help customers engage with flexibility to reduce their bills; support market participants in developing propositions; and enable system operators to better forecast, plan, and operate the energy system, reducing costs for all.

Add Third Party Collaborator(s)

baringa

University of Reading

Project Budget

£162,518.00

SIF Funding

£146,266.00

Project Approaches and Desired Outcomes

Problem statement

The role of flexibility is essential to a Net Zero energy system. Wind and solar output is expected to triple by 2035 (ESO Future Energy Scenarios). Similarly, we expect the number of LCTs, like electric vehicles and heat pumps, connected to increase substantially over the next few years. With the intermittent nature of renewables, it's becoming increasingly important to manage fluctuations in demand and generation, network constraints and support the increase in LCTs. UKPN's DSO is working to maximise the use of flexibility as a smart, cost-effective solution to this rising demand, helping to enable the transition to Net Zero at a faster pace and lower cost for all.

Currently DSOs and ESO, have limited visibility of where flexible resources are available until flexibility providers respond to requests for flexibility. This can lead to sub-optimal network investment planning and utilisation as the level of available flexibility (and future flexibility) is unknown and requires market discovery efforts.

At the system level, lack of insight of total potential flexibility forces the ESO to utilise generation for managing imbalance, often using fossil generation to support short-lived peak demands. Lack of visibility of flexible resources is worsened by LCTs that are not visible to network operators as occasionally some LCT installers do not notify networks.

KnowMyFlex proposes Energy Flexibility Certificates (EFCs) for households – analogous to existing Energy Performance Ratings – that provide a measure for a home's capacity for flexibility or how smart it is.

KnowMyFlex addresses Challenge 1, Scope 1 by leveraging this concept to increase the visibility of flexibility – available and potential – to allow a bottom-up understanding of future demand. This will improve coordination, modelling and planning capability. EFCs will also enable customers to better understand their flexibility and encourage uptake of technologies for participation in flexibility markets as well as improve processes for managing and operating the network.

The digital architecture and enabling processes for EFCs would require data integration, alignment with the market-wide Half-hourly Settlement, flexibility modelling at scale, and operational use of data to deliver benefits to customers and system operators.

The concepts involved in EFC have been developed by the Centre for Research into Energy Demand Solutions (CREDS), based at the University of Reading (Towards a demand flexibility certificate – CREDS). This team will be directly involved in this SIF project and in developing EFCs for I&C Customers under an accompanying SIF project led by SSEN.

Video Description

https://youtu.be/O7gX_DlOSmw

Innovation justification

KnowMyFlex's innovation lies in developing EFCs designed to offer homeowners a straightforward and intuitive means of gauging their home's capacity to engage with the smart energy system. Additionally, it highlights the associated financial and carbon savings achievable through such participation.

The primary users of EFCs will be consumers, addressing an information and understanding gap. It can help price a value on flexibility to incentivise home upgrades that can also increase property value.

System Operators will also be users of EFCs as they can be used to optimise network planning and manage constraints, taking account of existing and potential flexibility and projected uptake of LCTs.

The same information can be also used by Local Authorities to inform development of Local Area Energy Plans (LAEPs) and design of intervention programmes to support vulnerable and fuel poor customers. Similarly, the concept provides an opportunity to integrate with the ENA Direct Connect tool, streamlining processes for LCT installers. Finally, the EFCs data will be useful for market participants seeking to engage consumers and develop and target propositions to drive engagement and uptake.

The methods, tools, and processes to create EFCs do not exist, and this project will test the concepts for their provision. KnowMyFlex aims to identify use cases and develop enabling infrastructure for the EFC concept. The research output specifies a set of metrics for flexibility which are combined for a single flexibility certificate for a property. In parallel, Centre for Net Zero (CNZ) has published a press release outlining the concept of Smart Building Rating (SBR) which has similar intention to visualise flexibility and track roll out of LCTs. The project will align with the CNZ to maximise synergies in the work. Both SBR and EFC are concepts that require development of the enabling infrastructure and commercialisation models. CNZ will support the Discovery Phase as a stakeholder to guide thinking and also be a potential partner for future phases.

Current readiness levels for EFCs are low, with the Discovery aiming to move TRL from.4 to 5; CRL from 1 to 4; and IRL from 0 to 2.

This funding cannot be justified as BAU within the price control as this novel approach requires validation and would be an industry-wide initiative. The counterfactual solution is to rely on flexibility providers to report available flexibility in response to flexibility tenders.

Impacts and benefits selection (not scored)

Financial - future reductions in the cost of operating the network

Financial - cost savings per annum on energy bills for consumers

Environmental - carbon reduction – direct CO2 savings per annum

Environmental - carbon reduction – indirect CO2 savings per annum

Revenues - improved access to revenues for users of network services

New to market – products

New to market – processes

New to market - services

Others that are not SIF specific

Impacts and benefits description

Numerous studies have estimated the value of flexibility – for instance the Flexibility in GB report by Imperial College and the Carbon Trust which estimates annual savings of £16.7bn per year by 2050 in an electrified heating scenario, with the majority of

additional flexibility compared to today coming from the smart use of EVs and domestic heating. Today, only motivated customers are engaging with flexibility propositions, with others left behind. Networks have limited visibility of flexibility, and EFCs seek to promote customer engagement and visibility of flexibility to assist in delivering these benefits.

Financial - future reductions in the cost of operating the network

EFCs enable network operators to optimise their strategic investment planning against the available flexibility potential and uptake of LCTs, thereby deferring and reducing network reinforcement. Flexibility can also be used to reduce operating costs such as the need for emergency repairs and temporary generation following outages.

Financial - cost savings per annum on energy bills for consumers

EFCs are expected to increase understanding of flexibility by customers and encourage them to access flexibility propositions from suppliers and aggregators. With the market-wide half-hourly settlement transformation, more customers will have opportunity to take advantage of the time-varying tariffs and reduce their bills through flexibility.

Environmental - carbon reduction – direct CO2 savings per annum

With EFCs, households will have better visibility of options for LCTs suitable for their property, and potentially a wider array of propositions proposed to them by service providers. They will be encouraged to participate in LCTs like rooftop solar, and to allow their demand to be managed to take advantage of low carbon generation when it is available.

Environmental - carbon reduction – indirect CO2 savings per annum

A reduced need for network expansion could reduce the consequential embodied carbon of asset delivery programmes.

Revenues - improved access to revenues for users of network services

EFCs offer a way of accessing key information about flexibility (existing and potential) from a household that can be used by energy retail suppliers to offer a tailored tariff or product.

New to market – products, processes, services

EFC enabling functions would require new processes introduced by the primary stakeholders (e.g. network companies) and will encourage new products and services enabled by EFCs.

Others that are not SIF specific

Improved visibility of assets connected to the network so that DNOs have a complete asset register.

Teams and resources

UKPN and Baringa have worked on market-leading innovation projects together since 2010. The University of Reading is new to the group, but a key member of the CREDS group (Timur Yunusov) works at both Baringa and the research group, and so brings tight links that will make this project a success.

UKPN are the DNO leading on the development of EFCs for residential customers (KnowMyFlex), with SSEN leading a related project looking at I&C Customers (MaxFlex). These projects will share the costs of common elements of the Discovery work (e.g. joint exploration of the digital infrastructure), whilst separately exploring the needs and use cases associated with the different customer segments. The DNOs will provide key input into understanding the customers, stakeholder engagement, and the DNO use-cases and benefits that can be enabled by EFCs.

Baringa Partners are a specialist energy sector consultancy with deep commercial and market expertise. They are ideally suited to supporting this project given their role advising government, regulators, and networks on flexibility market development, as well as their work for a wide range of market participants building customer propositions and business models in the energy services industry. They also bring specific expertise in digital industry infrastructure, evidenced for instance in their role building the ENA Connections Platform. Finally, Baringa bring an independent viewpoint that will serve to ensure that EFCs are developed in a way that enables all customers and market participants without bias toward a particular solution.

Baringa will lead the development of the EFC data structure and enabling digital architecture, as well as identification of the EFC use cases for all parties that can drive benefits, and the accompanying cost/benefit analysis to validate priorities.

As an academic partner and the originator of the EFC concept, researchers at the UoR and their associated roles in the Energy Demand Research Centre hub will further develop the metrics for the residential EFCs, researching the metrics and refining the methodologies in coordination with project partners and stakeholders. The proposed project team at the UoR have been recognised by Ofgem and DESNZ for expertise in residential demand flexibility.

We will also work closely with Octopus Energy as a key stakeholder to maintain alignment with their Smart Building Rating thought paper (also developed with the University of Reading) and explore their ideas for joint innovation with DNOs in later stages of the project.

Project Plans and Milestones

Project management and delivery

UKPN will oversee project management using their established framework for delivery of innovation projects including best practice methods and tools – regular management meetings and status reporting, frequent team stand-ups, and a stakeholder governance schedule aligned with project work package timelines as detailed in the accompanying project management plan. The partners will use learnings from their experience with previous SIF Discovery and wider award-winning innovation portfolio to ensure the project is delivered successfully.

The work packages proposed are:

· WP1: Project Management (UKPN) – managing the delivery of the Discovery Phase.

· WP2: Use-cases and CBA (Baringa, UoR) –Determine appropriate use-cases for EFCs and build high level CBA model and develop high level route to market and commercial model for EFCs

· WP3: EFC Metrics and Structure (Baringa, UoR) – Research and define scope of requirements for data models behind for the EFC framework and included metrics; Scoping customer archetypes to develop suitable models

· WP4: Enabling Infrastructure (Baringa) – Research and define scope of requirements for infrastructure enabling EFCs: Architecture, access procedures, data gathering methods, operating model

· WP5: Stakeholder Engagement (Baringa, UKPN) – Identify and engage with stakeholders to inform EFC development

All Work Packages have clear ownership and accountabilities, with assigned lead partners, and clear activities and deliverables. Key dependencies between the workstreams are:

· Stakeholder engagement (WP5) will be required to inform all work packages.

· WP3 and WP4 are interdependent, as a detailed understanding of the proposed form of metrics is required to inform the enabling infrastructure design, and limitations of enabling infrastructure may also inform the form of metrics.

· Development of use cases and the CBA (WP2) will be informed by progress on the form of metrics (WP3 and WP4).

Risks and mitigations are set out in the risk register. Risks and issued will be managed using a RAID log, refreshed and reviewed continuously. Key risks are:

· Stakeholders required for capture of use cases or validation of them are not available in the time required by the project

· Obtaining the data required to show feasibility proves difficult, leading to use of assumptions which impacts quality of assessment

· Synergies between I&C and residential customer segments prove minimal, leading to additional workload on both KnowMyFlex and the related SSEN project MaxFlex

No planned or potential unplanned supply interruptions are anticipated at Discovery Phase, and this project will not have any direct or adverse impact on existing or future energy consumers and their premises.

Key outputs and dissemination

The objective of Discovery is to identify use-cases where residential EFCs have potential to deliver value for the networks, households, other stakeholders, and to develop a high-level design of digital infrastructure to support EFCs. By the end of Discovery, the project will deliver the following outcomes:

· Use-cases for EFCs to cover a range of geographies and demographics;

· Clarity on the benefits and costs of EFCs;

· Scoped data structures, models, and metrics required for EFCs, reflecting complexity of data structures for the different customer types;

· Requirements for the enabling infrastructure and data exchange;

· Engagement with stakeholders to ensure the direction of the development of EFCs leads to desirable outcomes and is building on learning from other projects;

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Specific outputs:

Project Management (UKPN)

- Project plan & governance approach

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Use-cases and CBA (Baringa)

- Use-cases, enablers, and beneficiaries
- Benefit and costs areas and the counterfactual narrative
- High-level commercial model
- CBA plan for Alpha

EFC Metrics and Structure (Baringa)

- Metrics and data models to enable use-cases
- Data requirements for metrics and models
- Outline design of data structure
- Prototype of EFC static and dynamic pages for residential customers

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Enabling Infrastructure (Baringa)

- High level design of EFC enabling digital architecture
- Outline of operating model to support use-cases

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Stakeholder Engagement (Baringa)

- Stakeholder engagement plan
- Stakeholder feedback on EFC concept and use-cases

Dissemination:

Discovery Phase learnings will be uploaded to the Smarter Networks Portal and feature on the UKPN innovation website with specific project learnings being disseminated at the IUK Show & Tell events and other possible dissemination events. Findings will also be reported back to stakeholders through the stakeholder engagement process.

All partners will be involved in dissemination activities, with materials created based on project outputs developed through the project.

UKPN will look to share project successes and discoveries via its social media channels with the possibility of publishing external press media where appropriate.

Maintaining competitive markets

Residential EFC will be accessible to all industry actors (with appropriate level of anonymisation) to increase visibility of flexibility and consequently increase competition among providers of flexibility services. Flexibility validation models, embedded in the EFCs simplifies the requirement for capabilities to participate in flexibility markets, thus reducing barriers to participation. These and other value add features enabled by EFC for a wide range of stakeholders, do not undermine the development of competitive markets.

Commercials

Intellectual Property Rights (IPR) (not scored)

The parties agree to adopt the default IPR arrangements for this project as set out in Section 9 of the SIF Governance Framework.

The partners recognise that knowledge transfer is one of the key aims of the SIF, and that the benefits of this project will be maximised by the ability of other licensees to be able to learn from the Project so as to create improved outcomes or reduce costs for consumers. The partners do not anticipate that the Discovery Phase (or any potential subsequent phases) will result in the creation of IPR that cannot be freely disseminated, and have no expectation of creating income streams or royalties from IPR outside of participation in a competitive marketplace for services that may be informed or stimulated via the outcomes of the project.

Value for money

Total project cost for Discovery is £162,518 and the total SIF funding requested is £146,266. The partnership is providing 10% contribution of £16,252. Each partner will be meeting their contribution through a labour in-kind contribution.

UKPN

- Total costs: £23,550
- Total contribution: £2,355 (10%)
- Total SIF funding requested: £21,195

Baringa

- Total costs: £120,700
- Total contribution: £12,070 (10%)
- Total SIF funding requested: £108,630

UoR

- Total costs: £18,268
- Total contribution: £1,827 (10%)
- Total SIF funding requested: £16,441

The costing, demonstrating value for money for the project, is based on sharing resources with the parallel application led by SSEN, addressing development of EFCs for I&C customers, project titled MaxFlex.

The team has been assembled with prior deep experience in flexibility modelling and domestic flexibility propositions and have

the relationships and expertise to deliver this work efficiently. We will leverage Baringa Partners' flexibility modelling capabilities, as well as UoR's work to date and expertise in developing the initial EFCs concept.

Baringa are a specialist energy consultancy with deep commercial and market expertise. We are aware that consulting rates will appear high compared to other rates. However, we believe they represent value for money because:

· Baringa's costs are based on their UKPN Framework Contractor rates, which has been determined through an ODEU-compliant procurement process run by UKPN, have been challenged competitively, and represent fair market value for the services required.

· Baringa are investing 10% of their costs. They are prepared to do this because the work is meaningful, exciting for their people, and deepens their relationship with UKPN and UKRI in the longer term.

· Baringa bring specific IP for use on the project, for instance in the form of energy market modelling software and price projections that they will use to model the value from flexibility, and informal access to a wide pool of experts and experience.

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There are no sub-contractor costs, nor funding from other innovation funds. Partners will leverage their own facilities (e.g. offices and IT).

The route to commercialisation for this project will ultimately be in providing customers, market participants, and system operators insight into the current and future flexibility potential of individual homes and buildings. This will enable better and more targeted propositions for consumers, and more accurate planning for networks. Cost recovery for administering EFCs will be explored in the project phases e.g. a subscription or membership model for commercial users and restricted use (e.g. selected data) for academic institutions.

Supporting documents

File Upload

KnowMyFlex - SIF Rd3 Discovery Phase - Show and Tell - v0.4 - clean.pdf - 819.4 KB
KnowMyFlex - SIF Rd3 Discovery Phase - End of Phase - v0.4 - clean.pdf - 1.8 MB
SIF Round 3 Project Registration 2024-07-08 10_23 - 64.7 KB
SIF Round 3 Project Registration 2024-05-13 10_48 - 64.6 KB

Documents uploaded where applicable?

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