SIF Round 3 Project Registration

Date of Submission

Jun 2024

Project Reference Number

10106524

Initial Project Details

Project Title

MaxFlex

Project Contact

Simon O'Loughlin

Challenge Area

Unlocking energy system flexibility to accelerate electrification of heat

Strategy Theme

Flexibility and commercial evolution

Lead Sector

Electricity Distribution

Other Related Sectors

Electricity Distribution

Electricity Transmission

Project Start Date

01/03/2024

Project Duration (Months)

3

Lead Funding Licensee

Scottish & Southern Electricity Networks

SSEN - Southern Electric Power Distribution Plc

Funding Licensee(s)

Scottish & Southern Electricity Networks

SSEN - Southern Electric Power Distribution Plc

Funding Mechanism

SIF Discovery - Round 3

Collaborating Networks

UK Power Networks

Technology Areas

Active Network Management

Modelling

Demand Response

Distributed Generation

Energy Storage and Demand Response

Project Summary

To maximise flexibility on electricity networks we need to know about two key facilitators:

•Firstly, the potential for flexibility from properties

•Secondly, the potential for connection to electricity networks

Without these, operators will struggle with network planning and flexibility procurement. This could increase costs and lead to expensive demand balancing solutions; especially where local authority, industrial and commercial buildings are concerned.

MaxFlex proposes to complement existing work assessing domestic flexibility by creating Energy Flexibility Certificates; for industrial, commercial, and local authority buildings. Adding electricity network capabilities, connection arrangements, and market opportunities should reduce bills and create more efficient electricity networks.

Add Preceding Project(s)

NIA2_NGESO001 - CrowdFlex

NIA_SSEN_0061 - HOMEflex (Household or Microbusiness Energy Flexibility)

10058729 - Local Energy Oxfordshire – Neighbourhoods (LEO-N)

10085252 - Local Energy Oxfordshire - Neighbourhoods, (LEO-N); Alpha R2

NIA_ENWL004 - Combined On-line Transformer Monitoring

10061354 - KnowMyFlex

Add Third Party Collaborator(s)

baringa

University of Reading

Greater London Authority

Project Budget

£157,334.00

SIF Funding

£137,102.00

Project Approaches and Desired Outcomes

Problem statement

The Problem

Flexibility and associated services are vital for resilient energy networks, that are cost effective for consumers, and able to grow at the pace required for Net Zero. Industrial and Commercial (I&C) properties currently have the ability to offer flexibility to network operators but are often unaware of the potential or the most appropriate route to market -- this presents a barrier to their participation. Having improved visibility of this resource will benefit both, I&C property owners and electricity networks, leading to better planning, operation, and development of energy networks.

Meeting Innovation Challenges

MaxFlex is addressing SIF Round 3, Challenge 1, Scope 1 by increasing the visibility of flexibility potential. It does this by introducing a concept called Energy Flexibility Certificates, where I&C properties, having better understood their potential as a flexibility provider, via a Static Rating and Dynamic Models associated with their properties. The concept is inspired by the Energy Performance Certification. The Static Rating is based on the information about controllability, reliability, operation, and potential of the flexibility from LCTs, gathered from the user survey and enhanced through property archetypes, customer personas and flexibility modelling. The Dynamic Models calculated from in-use data associated with the property, e.g. smart meter data, including historical use of flexibility, the connection capacity from the network and the environmental data for the area where the property is located.

The system architecture and the enabling processes for the EFCs will require novel arrangements in data integration, alignment with the market-wide Half-Hourly Settlement program, flexibility modelling at scale, commercialisation, and operational use of data to deliver benefits to customers and system operators.

Users of the innovation

The primary users of this innovation will be I&C Building owners.

The EFC will give clear quantification of the potential flexibility within buildings, helping to highlight the potential route to participation. This will allow I&C/Local Authority customers to take the right course of action to participate in flexibility markets most effectively.

Other public and network work

*The initial concept, structure and metrics for EFCs was developed by the members of the Flexibility Theme in the Centre for Research into Energy Demand Solutions (CREDS), at the University of Reading (UoR)

*UKPN are proposing a complimentary SIF project, KnowMyFlex, for flexibility in domestic properties

*We are also liaising with the Centre of Net Zero who are investigating the concept of Smart Building Ratings for residential properties

Video Description

https://youtu.be/HxcNvxu26t4

Innovation justification

Why Innovative

This project takes inspiration from the concept of Energy Performance Certificate and its innovation is to introduce a similar concept focused on provision of Energy Flexibility Certificates (EFC) to I&C properties. The concept introduces metrics and indicators and enables the visualization of flexibility at customer site level to energy networks.

Like the EPC, the EFC provides an intuitive format for I&C customers to understand the value of available and potential flexibility, allowing them to make informed investment decisions, better access revenue from flexibility services and minimise carbon emissions. Similarly, this will enable DSOs to target the most relevant business for additional support on entering flexibility markets.

Building on previous research

The concept leverages research from CREDS at the University of Reading. The research specifies a set of relevant flexibility metrics that associate with certificates. These metrics when collated, will provide visualised data and information that can be used to assess the potential flexibility available to networks.

The Centre for Net Zero (CNZ) have also published a press release outlining the concept of Smart Building Ratings (SBR) for domestic properties. There is no duplication with the SBR being for residential properties; however, we will be liaising closely with the CNZ to maximise outcomes from both projects.

Fitting the SIF Challenge

The concept enables I&C/Local Authorities to understand their potential as flexibility market participants. Digital tools will be used for engagement and data collection. The EFC certifies the flexibility potential and the capability of the premises network connection. .

Once collated, and visualised, this allows building owners and network operators to engage more effectively. Building owners can be better informed and confident in their decision making and electricity networks can use feedback in digital platforms providing more accurate flexibility forecasting. The concept will also fit into other digital initiatives within the energy industry, such as the ENA Direct Connect.

Why not BaU

The processes and tools to enable this capability do not exist and are thus not appropriate for BaU funding. Building owners do not have visibility of their flexibility potential, nor how to maximise this flexibility.

The EFC will introduce processes, tools, and commercial models that allows I&Cs to maximise their flexibility potential and provide better visibility of their connection capability. This project aims to test the feasibility of the concept and introduction of the processes, tools, and models above.

Impacts and benefits selection (not scored)

Financial - future reductions in the cost of operating the network

Financial - cost savings per annum for users of network services

Revenues - improved access to revenues for users of network services

New to market – processes

New to market - services

Impacts and benefits description

Financial

Network operators do not have clear visibility of the flexible technologies used by the I&C estates within their network. Visibility of these, together with a certification of how much demand and generation flexibility they can provide becomes valuable data, enabling the cost savings in the following areas:

More accurate modelling, leading to better informed forecasting
Ability to produce frequent and more complex models, leading to better planned outcomes
Speeding the dispatch of flexibility services, leading to more effective network operation
Ability to provide more options for non-network solutions, reducing the cost of network development through wider participation in flexibility markets

Increased market liquidity in flexibility markets through a diversification of service providers and sources of flexibility
Increased ability to make better informed and efficient network investment decisions. These reduce the costs to operate, develop the network and positively impact consumer bills.
During Discovery it would be possible to carry out studies into possible operational efficiencies gained in modelling, planning, speed of service dispatch and measure the benefits that can be achieved.

New to market | products, processes | services

Through this initiative, a collection of products, services and processes will be introduced. The EFC itself is a product which will help I&Cs participate in flexibility services. This introduces processes to engage with that entity, and offers them services they can take part in. EFC at the same time, incentives commercial properties to take part in Demand Response, thus reducing their consumption and bills. Furthermore, EFC is a compliment to other industry initiatives, especially the ENA's Connect Direct, and can provide seamless processes for LCT installers and their customers.

Revenues - improved access to revenues for users of network services

Because the EFC defines a commercialisation model for the I&Cs, there is opportunity for participation in flexibility markets, which brings revenue for the I&Cs, leading to further market maturity, potential evolution of other innovative products and services, and cross industry collaboration for the participants. Throughout the study, it would be possible to understand baseline consumption and generation for certain commercial archetypes and thus derive the benefits they might receive in terms of revenue or cost savings. Furthermore, by clearly identifying areas for improvement to increase flexibility, cost benefit analysis can be done by individual I&C to determine the best strategy to maximise their overall return on investment and minimise their carbon footprint.

Teams and resources

Scottish and Southern Electricity Networks (SSEN) Distribution serve over 3.8 million homes and businesses across the north of Scotland and central southern England.

SSEN is committed to delivering a safe, reliable supply of electricity to homes and businesses through infrastructure that aligns with UK and Scottish Governments' net zero commitments. The use of flexibility services allows us to reduce our reliance on and improve delivery efficiency of costly reinforcement, particularly where the need for capacity is urgent, transitory, or uncertain, and to reduce our reliance on carbon-intensive generation to ensure security of supply during planned or unplanned outages.

In 2022/23, SSEN Distribution utilised 354 MWh of flexibility, and tendered for 54 MW of flexibility capacity and to date in 23/24 has tendered for over 136 MW. The focus of this work has been in the central southern England license area making SSEN ideally placed to lead MaxFlex for industrial, commercial and local authority Energy Flexibility Certificates.

Baringa -- Baringa Partners are energy management consultants with expertise in energy networks. They have a history of working with several network operators in defining and implementing DSO strategies and have a deep understanding of the market dynamics and operations. They will bring this insight, as well as the ability to define and derive use cases that produce the data, process, digital and infrastructure models underpinning the EFC. They will support the project management activities and work directly with other partners to leverage their knowledge and concepts.

Greater London Authority (GLA) -- The GLA will bring their expertise both as the owner of an extensive property portfolio which has the potential to provide flexibility and to assist with identification and management of stakeholders, ensuring they are accessible, and engaged. Previous energy flexibility work such as FlexLondon and Carbon-free Energy 24/7 can also help to inform the project.

University of Reading (UoR) - UoR has done extensive research on this topic with some recent publications and will bring their insight to accelerate the work, having identified some use cases, data requirements and benefits.

Project Plans and Milestones

Project management and delivery

SSEN-D will take the lead on all Project Management activities. We will use the tools provided by UKRI (Risk Register, Project Plan), as well as tools developed internally (Gantt Chart, Project Costs, Finance Tracker) to regularly monitor project performance, including workpack dependencies. This approach has seen SSEN being scored strongly for project management in earlier SIF Rounds

Discovery will see delivery of 5 Workpackages (WPs), with each WP having an assigned lead, and a clearly stated set of deliverables. All deliverables and dependencies will be tracked using the project Gantt Chart - full detail can be viewed within the attached PM Book. Outline can also be seen in Q8.

The Project Team will meet weekly to review progress and collaborate as a group. We will support the team sessions with focused workpack collaborations, as well as face to face sessions (as/when required) to stimulate thinking and provide effective challenge while developing outputs.

A number of risks and barriers have been identified. The top scoring items can be seen below with a full list including mitigating actions identified available in the MaxFlex Discovery PM Book.

Risks:

Stakeholders required for capture of use cases or validation of them, re not available in the time required by the project. This will have an impact on the quality of the use cases or the schedule of delivery.
Obtaining the data required to show feasibility proves to be difficult, but necessary - for example spread of commercials or use of energy. This leads to use of artificial data, which impacts quality of assessment.
Stakeholders may not see the value of this initiative and thus deem the outcome as not giving value.
Other initiatives are too similar to this and thus invalidating this initiative, and yet not covering the full spectrum of its benefits.
The residential side of this innovation idea does not progress in alignment with this initiative and prevents presentation of wider and full benefits.
Expected Regulatory Changes: Project is not expected to require any regulatory changes throughout the Discovery or Alpha stage; The project will, however, as an output of Alpha deliver a recommendation of any regulatory change needed to make this approach a success.

The Project is not expected to impact on customers reliability of supply during the Discovery or Alpha Phase.

This project will not have any direct or adverse impact on existing or future energy consumers and their premises.

Key outputs and dissemination

The key output from the Discovery Phase of MaxFlex will be a clearly defined visual comprising all the elements required to assess what the maximum flexibility is for an industrial and/or commercial building or area.

Workpack 1 -- Project Management

Lead: SSEN

Purpose: Co-Ordination of deliverables, project performance, end stage report and alpha application. UKRI engagement.

Deliverables:

- PM Book
- Risk Register
- Meeting Outputs
- *Alpha Application

Workpack 2 - Use-cases and CBA.

Lead: Baringa

Support: SSEN, UoR, GLA

Purpose: Identify the key stakeholders and define the benefits and costs associated with them. Validate the use cases with the stakeholders and provide a commercial model for their operations.

Deliverables:

- Use Case Register
- Benefits and Cost Model
- Commercial Options Report
- Workpack 3 - EFC metrics and structure

Lead: Baringa

Support: SSEN, UoR, GLA

Purpose: Using existing work, map the metrics to the use cases, and identify any additional ones. Create a data structure to accommodate the metrics and design a visual prototype. Validate with relevant stakeholders.

Deliverables:

- Metrics and Data Model
- Visual prototype of static and dynamic part of EFC

Workpack 4 - Enabling infrastructure

Lead: Baringa

Support: SSEN, UoR, GLA

Purpose: Define typical owners for the data identified in previous work pack and define what infrastructure is required to acquire that data. Develop the process flows and how they will be operated.

Deliverables:

- Data Capture Infrastructure Design
- Data Capture Process and Operating Model

Workpack 5 - Stakeholder engagement

Lead: Baringa

Support: SSEN, UoR, GLA

Purpose: Execute stakeholder management and validate the findings with the stakeholders. Capture any lessons learnt and finalise the findings.

Deliverables:

- Stakeholder Report and Final Findings

Dissemination:

The project will be promoted using a multi-channel and multi-party approach, depending on the intended audience. Examples include:

- Amplification of UKRI, IUK and Ofgem official SIF communications
- Press releases, summit, websites and social media for general awareness
- Local media, social media, door drops, posters and word of mouth

The MaxFlex does not undermine competitive markets . EFC will have a positive impact on some of key factors in the market and

thus does not undermine competition. These are :

- Reduces barriers of entry: it's easier for participants to find their roles and participate
- Removes and reduces information asymmetry: participants have equal access to data, which is public
- Reduces network effects, meaning not one single or group of specific I&C will have advantage

Commercials

Intellectual Property Rights (IPR) (not scored)

To ensure clarity is provided to the Project partners, UKRI and Ofgem regarding the intellectual property (IP) landscape, the Project is using an IP register to track the Background IP provided to the Project, the Foreground IP the Project generates, and the use and access rights to all this IP.

The main contract governing the Project (the Collaboration Agreement) will include detailed, mutually agreed terms governing IP that are in line with the SIF Governance Document. For the Discovery Phase, all the IPR arrangements will follow the default recommendations of Chapter 9 SIF Governance Document.

Value for money

Total project cost will be £157,334. We are requesting £137,102 of SIF funding, with the partnership providing £20,232 compulsory contribution -- 13%, which will be met through 'Time in Kind'.

Where possible, we have benchmarked costs received against those used by equivalent suppliers who are already engaged on SSEN's frameworks.

SSEN (Lead) costed their work at £14,557 and are requesting £11,274 of funding. £3,283 of compulsory contribution will be met through 'time in kind'.
Baringa (Partners) costed their work at £119,509, requesting £107,559 of funding and contributing £11,950 through 'time in kind'. Baringa are responsible for majority of the deliverables, therefore requesting majority of funding. They are bringing their expertise in energy management consultancy and stakeholder management to develop the use case definition, benefits, data and business case modelling. Baringa will use their capabilities to put the infrastructure design in place, outlining how EFC can be taken into market.
University of Reading: have costed their work at £18,268 to allow involvement from the CREDS Flexibility Theme leads and additional research work from the University.
The GLA costed their work at £5,000 and are requesting £1 of funding and contributing £4,999 through 'time in kind'. The GLA are already working with many of the London Boroughs to improve energy efficiency, including flexibility. This includes the three west London Boroughs of Hillingdon, Ealing and Hounslow, all within the SSEN SEPD Distribution area. The GLA see this project as benefiting them, and the Boroughs, as such they are happy to fund their time for MaxFlex Discovery Phase.
WP1: Project Management: Costed at £21,033. SSEN will be leading this WP, with support from all other partners. The cost includes allowances for travel to test sites and face to face workshop facilitation
WP2: Use-cases and CBA: Costed at £47,736
WP3: EFC metrics and structure: Costed at £30,948
WP4: Enabling Infrastructure: Costed at £30,686
WP5: Stakeholder Engagement: Costed at £26,932
Baringa will be leading WP2 to WP5, withall partners expected to contribute to the deliverables.

The most suitable route to market will be explored during the project as the project looks to develop the correct approach.

The project partners will work together and involve the relevant teams at SSEN to deliver the desired benefits and implement the solution into BAU without delay.

The proposed solution would be applicable to all other GB DNOs, and wider UK areas.

Supporting documents

File Upload

Maxflex Show and Tell v1.pdf - 709.4 KB
MaxFlex End of Phase for UKRI 30 June 2024 FINAL.pdf - 3.0 MB
SIF Round 3 Project Registration 2024-06-20 1_38 - 62.2 KB
MaxFlex Appendix FINAL.pdf - 532.7 KB

Documents uploaded where applicable?

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