# SIF Round 3 Project Registration

### Date of Submission

Jun 2024

### Project Reference Number

SPEN_SIF_10104876

## Initial Project Details

### Project Title

EquiFlex

### Project Contact

Michael Green

### Challenge Area

Novel technical, process and market approaches to deliver an equitable and secure net zero power system

### Strategy Theme

Flexibility and commercial evolution

### Lead Sector

Electricity Distribution

### Project Start Date

01/03/2024

### Project Duration (Months)

3

### Lead Funding Licensee

SPEN - SP Distribution Plc

### Funding Licensee(s)

SPEN - SP Distribution Plc

### Funding Mechanism

SIF Discovery - Round 3

## Collaborating Networks

SP Energy Networks Distribution

## Technology Areas

Commercial

Poverty

Stakeholder Engagement

## Project Summary

Increasing flexibility is required on energy networks to manage changing demand and generation patterns. This includes reducing power consumption at system peaks (e.g. winter teatimes); and increasing power consumption at certain times to take advantage of renewable energy availability.
Consumers can benefit from providing flexibility, through payment for providing services to the network. However, currenty, access to participation in flexibility markets is likely limited to the most affluent and engaged consumers.
Equiflex aims to promote equal access to the participation in flexibility markets, ensuring no customers are unfairly left behind and enabling a just transition to NetZero.

## Add Preceding Project(s)

SSEEN0 - TRANSITION

NIA_UKPN0069 - Socially Green

## Add Third Party Collaborator(s)

Energy Action Scotland

East Ayrshire Council

Frazer-Nash Consultancy

## Project Budget

£148,567.00

## SIF Funding

£133,704.00

# Project Approaches and Desired Outcomes

## Problem statement

**Problem statement**

Equiflex addresses Innovation Challenge 2 -- "Novel technical, process and market approaches to deliver an equitable and secure net zero power system" and Theme 4, "Enabling disadvantaged consumer segments to participate in flexibility markets"

**The Problem**

Increasing flexibility is required on energy networks to manage changing demand and generation patterns, as the UK transitions to Net Zero, via the electrification of heat and transport.

Accessing consumer flexibility at system peaks benefits network operators, by potentially helping them to reduce or defer investment in network upgrades. Accessing consumer flexibility at other times will allow increased uptake of variable renewable energy generation when it is available, which will have financial benefits (minimising constrained-off payments at times of high renewable energy availability but historically low system demand) and environmental benefits (maximising use of low-and zero-carbon power; reducing need for storage infrastructure).

However, flexibility innovations to date have largely focused on prosumers, and more affluent and engaged consumers are most likely to be in this category. How can we ensure a just transition to Net Zero, in which opportunities to participate inflexbilty markets are available to all?

The project will address the challenge aim by developing an approach to flexibility provision that considers all customer needs, focusing on hard-to-engage and more vulnerable customers. It will investigate the particular network flexibility needs that they are best able to contribute to, and will look at the interaction between these and other initiatives being pursued to achieve Net-Zero, such as the local heat and energy plans (LAEPs in E&W, LHEESs in Scotland) that are being developed by local authorities.

**Innovation Users**

DNOs - better understanding of flexibility options and amounts available for each part of the network; development of new, tailored flexibility products; better linkage of network development with whole system net-zero initiatives

Customers & their representatives - greater ability to benefit from flexibility savings; increased network resilience; faster path to adopt low-carbon technologies without waiting for network upgrades

Local authorities - efficiency savings from exploiting synergies between network needs and their Net-Zero initiatives (e.g. Local Heat and Energy Efficiency Strategies (LHEESs)/Local Area Energy Plans (LAEPs); making positive interventions in their communities to benefit more vulnerable residents

**Previous Funding**

This is a new project and no previous funding has been received. It will however draw on findings from innovation projects completed by others, such as 'Transition' and 'Socially Green'.

## Video Description

https://www.youtube.com/watch?v=gc7ufd1g1qc

## Innovation justification

**Equiflex's Core Innovations are:**

- Developing new flexibility options specifically designed for target groups
- Linkage with LHEESs/LAEPs

- Developing a 'Toolkit' to identify optimal localised flexibility options given network parameters and customer demographics

**Previous relevant work includes:**

- 'Socially Green' (NIA) - studied customer perspectives on flexibility. Equiflex develops this by increasing customer-network interaction and including other aspects (e.g. LHEESs/LAEPs) affecting customer energy usage.
- 'Transition' (NIC) - trialled various flexibility options, gaining end-to-end understanding of provision, use and settlement of flexibility. Equiflex develops this by considering targeted options for less engaged and more vulnerable customers, and prioritising options based on local network parameters.

**Readiness Levels**

Individual customers' flexibility use is in its infancy, and integration of distribution-level flexibility is also at an early stage. Extensive increases in system and process automation will likely be needed to fully realise benefits. It is also important to consider system effects, e.g. how flexibility in one area affects wider network performance. LHEESs/LAEPs are at an early stage, so Equiflex provides the first opportunity to consider their network impacts.

During Discovery, we will investigate and document the TRL, IRL and CRL of the proposed flexibility options.

**Scale & Appropriateness**

SIF is the best funding mechanism for Equiflex, as it allows initial investigation of novel concepts relatively cheaply, with subsequent work and funding subject to a satisfactory case being made at each review stage. An appropriate Discovery Phase is described in this application, but we have also considered project progression through subsequent phases.
The current development level of the project elements means that early-stage R&D in this area is beyond the scope of SPEN's BAU. It requires extensive collaboration between diverse stakeholders to understand interactions between different sectors and develop a mutually beneficial path forward. Equiflex allows early consideration of relevant issues and could unlock efficiencies or investment downstream that could be treated as BAU.

**Counterfactuals are:**

(1) 'Do nothing' - DNOs simply respond to the market demands for flexibility services and take any benefits provided. The disadvantage of this is that minimal savings will be available, and network upgrades are still likely to be needed as flexibility provision will be piecemeal.

(2) investigate flexibility, but without customer focus. This poses the risk of vulnerable customers being left behind through failure to consider their needs, and potential system synergies being under-exploited.

We therefore conclude that our proposed approach provides the best solution to the stated problem.

## 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

New to market – products

New to market – processes

New to market - services

Others that are not SIF specific

## Impacts and benefits description

Flexibility becomes increasingly important as electrification of heat and transport progresses, and pressure on network capacity

increases.

Whilst there is encouraging use of flexibility options by customers, markets remain in their infancy, and products require further standardisation. Past flexibility approaches focused on network needs, and didn't consider the customer perspective in depth. The "Socially Green" project has begun addressing that gap, investigating vulnerable customers' interactions with the energy transition. Equiflex builds on that, by investigating interactions between network flexibility needs, customer needs, and LHEES/LAEP needs. This whole-systems context will allow for wider access to particiption in flexibility markets. This will likely require development of new products, services and market processes. A key aim of Equiflex is getting early-stage customer engagement and developing an energy flexibility market with equality 'baked in'.

There is limited information available on the financial benefits of flexibility to networks - another gap Equiflex hopes to address. However, recent analysis by Danish manufacturer Danfoss estimates that EU and UK use of demand-side flexibility could save 40MT/y CO2 and €10.5bn/y societal costs by 2030. In the UK's Project LEO, the price paid for flexibility services was £300-1200/MWh.

**Benefit Methodology and Metrics**

During Discovery, we will develop a detailed methodology for calculating project benefits, referencing industry standards and guidance such as Ofgem's RIIO - ED2 Cost Benefit Analysis Template.

Anticipated metrics are:

- Avoided/deferred network upgrades -- cost saving (£) relative to the counterfactual of reinforcement proceeding as initially planned.
- Customer savings -- projected cost saving per customer (£/y) for the flexibility options utilised versus a counterfactual of them not participating in the flexibility market.
- Carbon savings will be calculated according to the methodology described in the UK Government's "Valuation of greenhouse gas emissions for policy appraisal and evaluation" document.
- New products, services and processes will be described qualitatively initially, with a quantitative analysis anticipated in later phases of the project on the items down-selected from the initial list as worthy of further investigation.

In Discovery, we anticipate reporting initial findings on a rough order of magnitude basis. In later project stages, further information will become available and modelling tools developed to allow a more granular treatment of costs and benefits. Particular customer groups or network segments can be investigated in detail, and different scenarios tested to develop a probabilistic analysis.

## Teams and resources

The team that will deliver the Discovery project is:

**ScottishPower Energy Networks (SPEN)** - DNO for the South of Scotland, North Wales and Merseyside, distributing power to 3.5 million customers.

**East Ayrshire Council (EAC)** - headquartered in Kilmarnock, south-west Scotland, responsible for providing a range of vital services to a community of around 120,000 people, and committed to tackling climate change and reducing fuel poverty.

**Energy Action Scotland (EAS)** - third sector organisation dedicated to ending fuel poverty. It's member charities provide consumer advice to over 3000 people weekly. It is a national centre of excellence, providing practical energy advice, research and training and working with government to develop energy policy.

**Frazer-Nash Consultancy (FNC)** - a leading systems and engineering consultancy with extensive energy system and customer perspectives expertise and a strong delivery record on network innovation projects.

The team has been brought together for this project, so Equiflex is responsible for the creation of new relationships between project partners' organisations.

SPEN will lead the project and will provide expertise and data on electricity networks, including how supply and demand are forecast to evolve as the UK transitions to Net Zero; information on network parameters and configurations; and which flexibility options are needed where.

EAC will provide expertise on LHEES targets and delivery, and will provide key inputs for the proposed case study, including

existing and planned energy schemes and local area demographics.

EAS will provide expertise on consumer abilities, needs and preferences, both now and in the future, and will input customer perspectives to each of the project work packages.

FNC will project manage and provide technical expertise, carrying out background research, leading the workstreams and co-ordinating reporting. They will facilitate the project workshop develop the cost-benefit analysis and outline modelling requirements and specifications for the toolkits.

Discovery Phase work will largely be desk-based, and carried out in the normal workplaces of the project team members, apart from the in-person workshop,which will bring the whole project team together at a single venue. To minimise expense, we plan to hold this in Glasgow, in which both SPEN and FNC have offices with suitable meeting facilities, and which is close to the other partners' locations.

All partners required to deliver the Discovery Phase are in the team listed above, but we will identify any additional partners needed for future project phases, and proactively engage with them when developing further plans.

# Project Plans and Milestones

## Project management and delivery

**PM Approach & Risk Management**

Frazer-Nash (FNC) will be responsible for Equiflex project management. FNC are highly experienced in innovation projects, having delivered several successful Discovery and Alpha projects in SIF Rounds 1 and 2.

A kick-off meeting is scheduled for week 1 of the project, with weekly meetings thereafter to update progress against plan, review and update the risk register and manage dependencies. These will be supported by ad-hoc meetings on specific issues as required. Progress will be reported regularly to the Monitoring Officer.

A key element of the plan is a full-day in-person workshop, scheduled for week 3.This will bring all partners together to discuss the different project elements in detail, confirm which items from the initial marketplace review should be in scope for Discovery, and confirm data requirements and responsibility for dataset provision. FNC will scope and convene the workshop. Early in-person engagement is key in building an effective project team with a collective vision and clear understanding of delivery requirements, allowing each team member to contribute expertise in a focused way, and ensuring effective distribution of roles and responsibilities to deliver the optimal outcome.

FNCs Transmission and Distribution Business Manager will supervise the project and an independent project auditor will ensure project delivery meets FNC's Quality Management Standards.

**Links and Dependencies**

WPs 2 and 3 have some dependency on WP1, as they require case study area characterisation and understanding of LA/DNO requirements for the toolkits. Dependencies are included in the project plan. However, some preparatory work can be done for both WP2 and WP3 prior to receiving WP1 conclusions.

**Policy and Regulatory Challenges**

There are no known policy or regulatory issues affecting the Discovery Phase. However, as we are investigating innovative solutions, such challenges may arise as we progress from concept to delivery. During Discovery, we will carry out a high-level assessment of such restrictions for detailed consideration in future phases. The constraints identified will also inform the recruitment of additional partners to enable these issues to be addressed effectively.

**Consumer Impact/Interaction and Supply Interruptions**

This project will not result in any supply interruptions. During Discovery, customer perspectives will be represented by project partners Energy Action Scotland and East Ayrshire Council. In subsequent phases, it may be necessary to engage directly with customers and/or additional representatives thereof. The best mechanisms for this will be considered during Discovery, as we roadmap future project development.

## Key outputs and dissemination

**Discovery Aims**

WP1 will

- list the flexibility products that are currently available, ways these can be accessed and any barriers to access, focusing on barriers affecting more vulnerable and less engaged customers.
- investigate whether the characteristics of energy consumption among the target groups provides opportunities to develop new flexibility products
- summarise the main drivers contained in LHEESs/LAEPs and consider where there are potential synergies between delivery of these plans and delivering energy market flexibility.
- identify a case study area which can be used to demonstrate the costs and benefits of increased engagement between consumers and flexibility markets.

WP2 will

- produce a high-level cost-benefit analysis of the different flexibility options identified by WP1, comprising rough order-of-magnitude costs and benefits for networks and consumers of adopting the different options.
- define which options are worth pursuing in greater detail in subsequent project phases.

WP3 will

- begin developing a 'toolkit' to help stakeholders (DNOs, local authorities, community energy groups etc) determine the best flexibility options to pursue in a particular area, given its energy needs, network configuration and consumer demographics.
- investigate the input and output data requirements for the toolkit and begin drafting a suitable model architecture. This will form the basis for developing the toolkit in future project phases.

**Responsibility for Outputs**

FNC are responsible for delivery of each of the key tasks in WP1, WP2 and WP3 and presenting the conclusions of each work package in a summary slide deck.These can be uploaded to the ENA innovation portal at the end of Discovery, subject to redaction of any commercially sensitive material.

**Project Dissemination**

The project partners will collaborate on the dissemination of the project outputs, which will be shared through the 'show and tell' webinar and through posts on forums such as LinkedIn. Towards the end of the Discovery Phase, we will decide if it is appropriate to present any of the project findings at the 2024 Energy Innovation Summit and/or to the ENA. Sharing of outputs outwith the energy industry, via other forums relevant to project partners, will be discussed during the discovery phase.

Competitive Market Development

Equiflex will support the development of competitive markets by providing asignificant improvement to understanding of flexibility markets and the contributiontarget groups of customers can make to them. This may include the definition ofnew products and services for which markets will be able to develop effectivesolutions.

# Commercials

## Intellectual Property Rights (IPR) (not scored)

The project will use the default IPR arrangements set out in the SIF Governance Document.

## Value for money

**Total Project Cost:** £148,567
**SIF Funding Required:** £133,704
**Project Contribution:** £14,863 (equivalent to 10% of project cost)

The balance of costs and SIF funding across partners reflects the effort required from each partner for delivery of the specified work packages, as described in our response to Q6 above. The contributions from partners equate to 10% of project costs.

There are no subcontractors being used in the Discovery Phase - all work will be completed by the project partners.

No additional innovation funding from other sources is being used in this project.
Project work will be carried out at the partners' normal workplaces, and it is anticipated that the in-person workshop will be held at one of the partners' offices in the West of Scotland.

**Value for Money:**

The discovery phase is an opportunity to establish best practice, developing energy flexibility markets in which all customers are granted equal opportunity to participate.

By taking a whole systems approach, it allows solutions to be developed which take account of synergies between different groups of stakeholders, and which thereby produce the most efficient overall outcome.

The proposed approach will canvass the views of customers, ensuring that their measures of value for money are considered throughout the project.

The bringing together of cross-sector expertise will offer immediate value for money benefits, providing a forum for networks to have visibility of developing energy plans and initiating discussions on how to better prepare and plan for the development of LHEESs and their impact.

Improved network resilience has the potential to provide immediate direct benefits to customers, specifically for vulnerable customers who are increasingly reliant on a dependable energy supply.

More broadly, the project offers significant potential in future phases to be developed into a tool that can be used to inform and substantiate future investment planning decisions. By taking a whole system view, the project will support the development of a UK energy network that is better prepared for the impacts of the move to net zero, whilst ensuring that the most vulnerable customers are not left behind during the transition.

Transition to business as usual is likely to require co-operation across GB energy networks, particularly in light of the ENA-led project to standardise flexibility products. This will be investigated and mapped as the Equiflex project develops.

## Supporting documents

### File Upload

SIF Round 3 Project Registration 2024-06-07 9_27 - 64.7 KB

### Documents uploaded where applicable?

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