

# SIF Alpha Close Down Report Document

## Date of Submission

Dec 2023

## Project Reference Number

10037410

## Project Progress

### Project Title

Crowdflex: Alpha

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10037410

### Lead Funding Licensee

NG ESO - National Grid ESO

### Project Start Date

August 2022

### Project Duration

6 Months

### Nominated Project Contact(s)

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## Project Summary

CrowdFlex will meet the aims of the SIF Innovation Challenge by establishing domestic flexibility as a novel, reliable flexibility resource of national significance, alongside BAU alternatives in system balancing services, generation capacity or network reinforcement.

- By offering consumers simple and effective incentives, reflecting whole system challenges (e.g. grid responsive tariffs), it will reduce complexity, bureaucracy and barriers to entry for aggregators to deliver domestic flexibility.
- This will improve coordination between networks and other system participants, building on the work of the ENA Open Networks Project.
- By trialling consumer interventions (financial and informational) targeting different system challenges, CrowdFlex will clarify consumers' preferences and inform future market designs.
- Initially, by derating the stochastic portfolio capacity, it will overcome barriers to enable domestic flexibility to participate in deterministic energy markets and flexibility services. In parallel, CrowdFlex will develop innovative approaches that deliver domestic flexibility stochastically improving coordination of emerging innovations across the system.

CrowdFlex will work to address these challenges, offsetting system peak increases, which are projected to increase 19% between 2020-2030 (Consumer Transformation, FES 2021), with an unprecedented resource of domestic flexibility (~7GW turn-down, and >10GW turn-up). ESO and DSOs could use domestic flexibility to address a host of operational challenges, across reserve, energy balancing, addressing network constraints as well as supporting capacity and network investment planning.

Network innovation is central to CrowdFlex. It covers key network load growth challenges as heat and transport decarbonisation, addressing baseline load and flexibility. By trialling fully system transactive tariffs, including load reshaping and system stress events, CrowdFlex will support network planning and investment decisions. Similarly, investigating responsive load management will improve the economics of existing network assets and target future network and system investments.

Discovery confirmed the value of domestic flexibility and improved visibility of baseline demand, and the need to address constraint costs. It identified that portfolios would initially be declared as firm capacities, but a spectrum approach would also mature novel and more valuable stochastic services.

CrowdFlex brings together partners spanning the energy system, best placed to address whole system challenges in the following ways:

- NGESO are the ESO for the entire of GB. They design and procure flexibility services, balance energy following gate closure, and model demand and generation in the FES to plan capacity and network infrastructure investments.
- Octopus are an energy supplier with a focus on renewable energy and offering their customers innovative tariffs and services to encourage the uptake of flexibility.
- CNZ provide world-leading expertise in their modeling capabilities, data science, and consumer engagement work. As CrowdFlex seeks to mature stochastic nature of domestic flexibility, they're expertise will be crucial to model this.
- SSEN and WPD are DSOs with >1GW of combined flexibility services contracted. The DSOs will provide detailed insight into the their needs and steer on how the conflicts between the needs of ESO and DSOs can be avoided/mitigated.
- Ohme are a home EV CPO providing smart charging and flexibility services. They are experts in consumer segmentation and have experience in providing domestic flexibility via EV charging.
- Element Energy are a leading low-carbon energy consultancy. They work across all major low carbon energy sectors, bringing together the different levels of the power system explored in CrowdFlex. They have supported CrowdFlex partners in the previous phases of the project.

CrowdFlex aims to develop novel flexibility services and modelling, and evidence delivery reliability to solve whole system challenges. ESO/DSOs can use this innovation to reduce operational costs and reduce capacity and network investments. The system savings from ESO/DSOs and a proportion of the revenue from flexibility services will be passed down to consumers, reducing their energy bills.

## Project Description

CrowdFlex is a study to understand the role domestic flexibility can play in addressing the system challenge of decarbonisation. As more VRE and LCTs are added to the network, it will become increasingly difficult to balance supply and demand. Domestic flexibility provides a huge opportunity during this transition to build a smart flexible energy system by enabling consumers to act as a new source of flexibility. CrowdFlex explores how domestic flexibility can be utilised to align demand to generation, improve coordination across the network, reduce stress on the system, while reducing consumer energy bills via new tariffs and incentives. The objective of CrowdFlex is to establish domestic flexibility as a reliable energy and grid management resource, providing it alongside BAU solutions such as network reinforcement or new thermal capacity.

Currently, flexibility services are procured deterministically, contracting a firm capacity, reflecting the operation of large thermal generators. However, domestic flexibility is inherently stochastic. Therefore, to participate in flexibility services, declaring a firm capacity means a derating of its potential flexibility capacity. This leads to lost flexibility and the need to over procure to ensure delivery. CrowdFlex will investigate the potential advantages of moving to a novel innovative method of procuring flexibility stochastically, via a Probability Distribution Function. This will be reflected in a spectrum approach to flexibility services. CrowdFlex will investigate how domestic flexibility can be rolled-out in the near term through deterministic flexibility services, helping accelerate decarbonisation and minimising costs, while also develop pathways to introduce stochastically procured flexibility services, unlocking more value for the whole system.

CrowdFlex aims to conduct a large-scale trial in parallel to developing a methodology to model domestic flexibility. A trial will be essential to fully understand the potential of domestic flexibility and its technical capability to deliver flexibility services. A model of domestic demand and flexibility is necessary to forecast baseline demand and the availability of assets to offer flexibility services. This will be part of the VirtualES ecosystem, improving demand-side visibility and so the operational and planning activities of ESO and DNOs.

If successful, CrowdFlex has the potential to deliver value across the energy system. Enabling ESO and DNOs to utilise domestic flexibility to reduce operational costs (namely constraints, reserve, and energy balancing) and capacity and network reinforcement investments. This will lower consumer bills and support the deployment of VRE and uptake of LCTs, accelerating whole system decarbonisation.

## Project Phase Summary

Project submitted to Beta, information on this submission can be found on the Application attached to this portal. please contact project lead for any additional information

## User needs

Project submitted to Beta, information on this submission can be found on the Application attached to this portal. please contact project lead for any additional information

### **Impacts and benefits**

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### **Risks, Issues and Constraints**

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### **Working in the open and legacy outputs**

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### **Costs and value for money**

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### **Project specific conditions**

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### **Documents uploaded where applicable**

Yes