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Ofgem Strategic Innovation Fund

# CrowdFlex Beta Annual Progress Report: Summary

January 2025



## Introduction

CrowdFlex is a NESO led Innovation project that is now in its beta phase and is playing a pivotal role in establishing domestic flexibility as a reliable grid management resource. CrowdFlex was awarded funding through Ofgem's Strategic Innovation Fund, which is managed in partnership with Innovate UK.

CrowdFlex represents a collaborative effort, bringing together expertise and innovation from OVO, Ohme, Centre for Net Zero, ERM, AWS, National Grid Electricity Distribution, and Scottish and Southern Electricity Networks. With the support of Smart Grid Consultancy, CGI, Smith Institute, and the Centre for Sustainable Energy.

The full annual progress report is available on the NESO website.

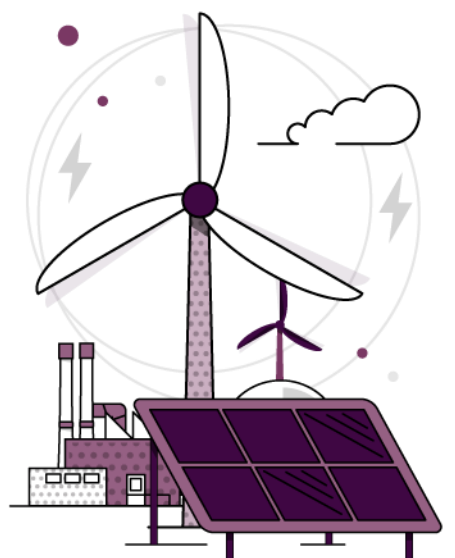


### **Cathy Fraser, CrowdFlex Project Sponsor, NESO**

*"CrowdFlex is highlighting how collective innovation and collaboration are driving meaningful steps towards a sustainable energy future. Domestic flexibility is a key component of a future net zero energy system which will ultimately translate into lower bills for consumers."*

## Background

CrowdFlex is seeking to address the challenge of how NESO, Flexibility Service Providers and Distribution System Operators (DSOs) can better understand residential customer behaviour and make the best use of domestic flexibility for grid operations.





**Carolina Tortora, Head of Innovation, Sector Digitalisation & AI, NESO**

*“Our pioneering CrowdFlex project is leading the way in establishing domestic flexibility as a reliable grid resource, by developing models to accurately forecast the potential of consumer flexibility. This exciting project is a fundamental step towards building a future digital grid, which is crucial for bringing more renewable generation online, and operating the GB energy system efficiently and effectively.”*

CrowdFlex is:

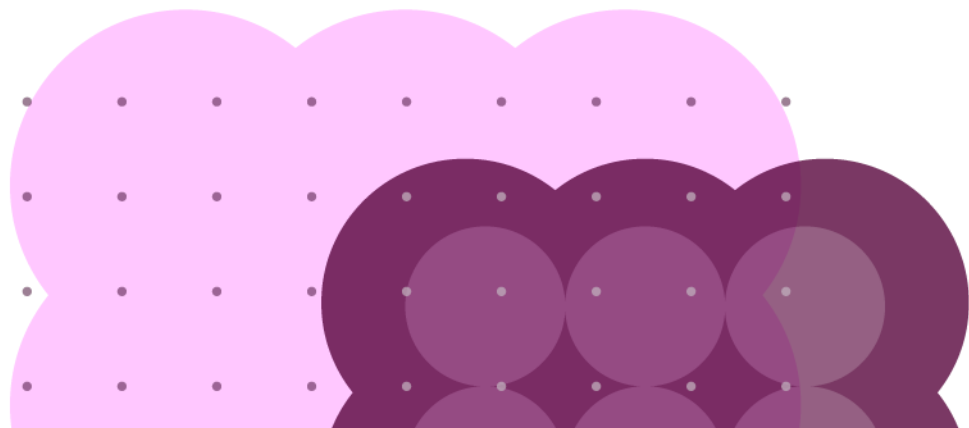
- developing statistical approaches for forecasting and procuring domestic flexibility
- developing two models; the Availability Flexibility Model (AFM) and the Expected Delivery Model (EDM)
- conducting large-scale domestic customer trials to enable model development and provide a greater understanding of domestic flexibility’s potential and technical capabilities
- establishing a pathway to rapidly accelerate domestic flexibility to business-as-usual operations, following the project’s completion

The project includes a series of summer and winter trials covering availability and utilisation services. Project partners OVO and Ohme EV’s customers are incentivised to use their electricity flexibly by adjusting their energy usage (turn-up or turn-down) or making assets like electrical vehicles available to the grid for automated control of when to charge.

The data from the trials will feed into the AFM and EDM and the models could then be used by services providers, NESO and DSOs.



**Sanna Atherton, CrowdFlex Project Lead, NESO** *“We’re excited to be in the beta phase of the CrowdFlex project and collaborating with key industry partners on this large-scale programme. Increasing renewable energy sources brings new challenges to balancing supply and demand. CrowdFlex is building forecasting models of domestic demand and flexibility and aims to firmly establish domestic flexibility as a reliable grid management resource, helping to reduce energy bills and to support the transition to a smart, flexible and zero carbon grid.”*



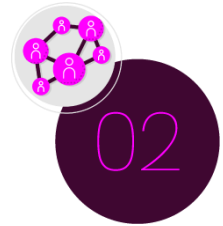


## Achievements



Successfully **completed the first summer trials in 2024** and analysed the initial results, which produced some interesting learning around domestic customer behaviour

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Successfully **agreed the relevant multiparty data sharing arrangements with the partners**, which has provided good learning for our SIF project, Powering Wales Renewably.

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**Customer feedback surveys** conducted with 3,600 participants.

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## CrowdFlex Learnings

The two models we are developing require seasonal service data to improve accuracy, so we have focused this summary on the valuable learnings gained from the summer and ongoing winter trials.

The insights gathered will inform future trial designs and our approaches to customer engagement, and this will support long term insights over the course of multiple trial periods. Learnings are being shared externally with key stakeholders and within NESO to inform our flexibility strategy.

## Key Learning Objectives

The detailed learning objectives for CrowdFlex can be found in the main report, but the overarching objectives for the project can be summarised as:

- Can simple incentives reduce complexity and barriers to entry for domestic flexibility providers?
- Can the project successfully trial various customer interventions?
- Can we prove that residential flexibility can reduce bills for customers?

With these objectives aiming to help achieve an affordable energy system fit for a decarbonised future.



## Learning so far

### Data sharing agreements

In order to share data across the project partners, we created two data sharing agreements. The first agreement was to separate the data needed or desired by the DSOs for sharing trial locations (postcode-only data), and the second was for the data needed by the partners to achieve the specific outcomes of the project. Separating the agreements into two, helped accelerate the process of getting the second agreement signed and ensured DSOs had visibility of the impacts to their network.

### Customer feedback surveys

The first of four customer feedback surveys was delivered in August 2024. The Centre for Sustainable Energy conducted the survey and a number of interviews with summer 2024 utilisation trial participants, with 3,600 OVO customers providing a response.



## Customer survey learnings:

over 60% of the participants reported that they felt like they were making a difference by participating in CrowdFlex, and 58% reported that they enjoyed the trial

### Incentives and event notice periods

Based on the summer trial results, there is evidence that simple incentives do work with consumers and that this results in successful delivery of flexibility services.

There was, however, little evidence of price sensitivity between different remuneration groups during the summer utilisation trial. Lower-remuneration groups performed roughly similar to higher-remuneration groups and we found that shorter notice periods may be more effective.

### Event and customer locations

We found that without granular data to confirm location and concentration of recruited customers, it can be necessary for DSOs to restrict certain areas from potential recruitment if network issues such as constraints exist. Also, if the impact of asking customers to turn up electricity usage on demand constrained parts of the network, or down where generation is dominant is unclear.

## 9k customers

When requested, over 9,000 customers turned up during the utilisation trials in one of the project partners Scottish and Southern Electricity Networks' areas.







## Recruitment messages

Four recruitment messages were tested for the availability trials. The most effective was to receive payment, but there was less difference in recruitment impact with non-fiscal messages than anticipated.

## Plug-ins

For Ohme EV customers, both smart and non-smart tariff groups demonstrated an immediate overnight plug-in increase from the start of the trial. The average overnight plug-ins increased, as did daytime plug-ins. The biggest improvement occurred in the late afternoon and the smallest first thing in the morning.

*It's important to note that there were insufficient events in the summer trials to make significant conclusions regarding the impact of event characteristics on flexible delivery.*

## Looking ahead

Whilst NESO's Demand Flexibility Service has shown residential flexibility can contribute to NESO balancing, the question remains whether residential flex can be a sustained, regular and reliable grid management resource in the future comparable with existing industrial and commercial provision. We set out to ascertain whether energy suppliers working with NESO and DSOs can engage consumers effectively in the provision of coordinated flex services to the betterment of the "system" and do so in a way that is measurably reliable. Early evidence from the summer trials suggests that this objective can be met. Reliability measurements will improve as the evidence base builds and greater opportunities arise to test a wider range of operating parameters.

## Future trials

We discovered through the summer trials that we needed deeper insights into the types of customers that respond most frequently (customer archetypes), and the winter trials are exploring this in more detail.

The winter trials are currently underway, and building on the summer trials we are testing:

- Larger numbers of events
- Larger numbers of participants
- Events spread across different days of the week
- Increased weekly frequency, including multiple events a day
- Alternative messaging
- How low income and vulnerable customers interact with flex services
- Segmentation of trials participants into specific customer archetypes

We are conducting further tests on event notifications and reminders and identifying teaching opportunities and other improvements in customer communications. Alongside reminders, OVO is working with Amazon Web Services (AWS) for Alexa being introduced in summer 2025 with links to automated devices/assets. We are also focusing on improving



the experiences and outcomes of low electricity users, and how CrowdFlex participants have competing demands for their flexibility and how this impacts the project.

## Objectives

As we progress through the trials and gain more data, we aim to answer further learning objectives:

- Can participation in the CrowdFlex trial prove that residential flex will not necessitate any major changes in contractual arrangements of consumers?
- In the utilisation trials, how many customers were expected to turn up vs the number who actually turned up?
- What were the primary technology types involved in turn up?
- How effective domestic flex is at resolving network constraints?
- The reliability of domestic flex, to inform how much we aim to over-procure
- What are the response characteristics of domestic flex to inform our commercial strategy and who we target with which flexibility products?
- How far ahead do energy suppliers know the domestic flexibility resource available, to inform the timescales which we procure our flexibility products?
- Where should domestic flexibility sit within the wider ecosystem of flexibility services and providers?



### **Josh Visser, Innovation Incubator Senior Manager, NESO**

*“CrowdFlex is one of the first innovation projects to be incubated in this exciting new NESO function. The first year of the project’s beta phase has been highly successful with industry partners collaborating and gaining a valuable, deeper understanding of domestic flexibility, which is crucial for future operations as more renewable generation is connected to the grid. We’re eager to see what insights will be gained in the remainder of the beta phase, as the project progresses towards business-as-usual integration.”*

## Our Partners



Ohme



**Centre for Net Zero**  
Powered by Octopus Energy Group



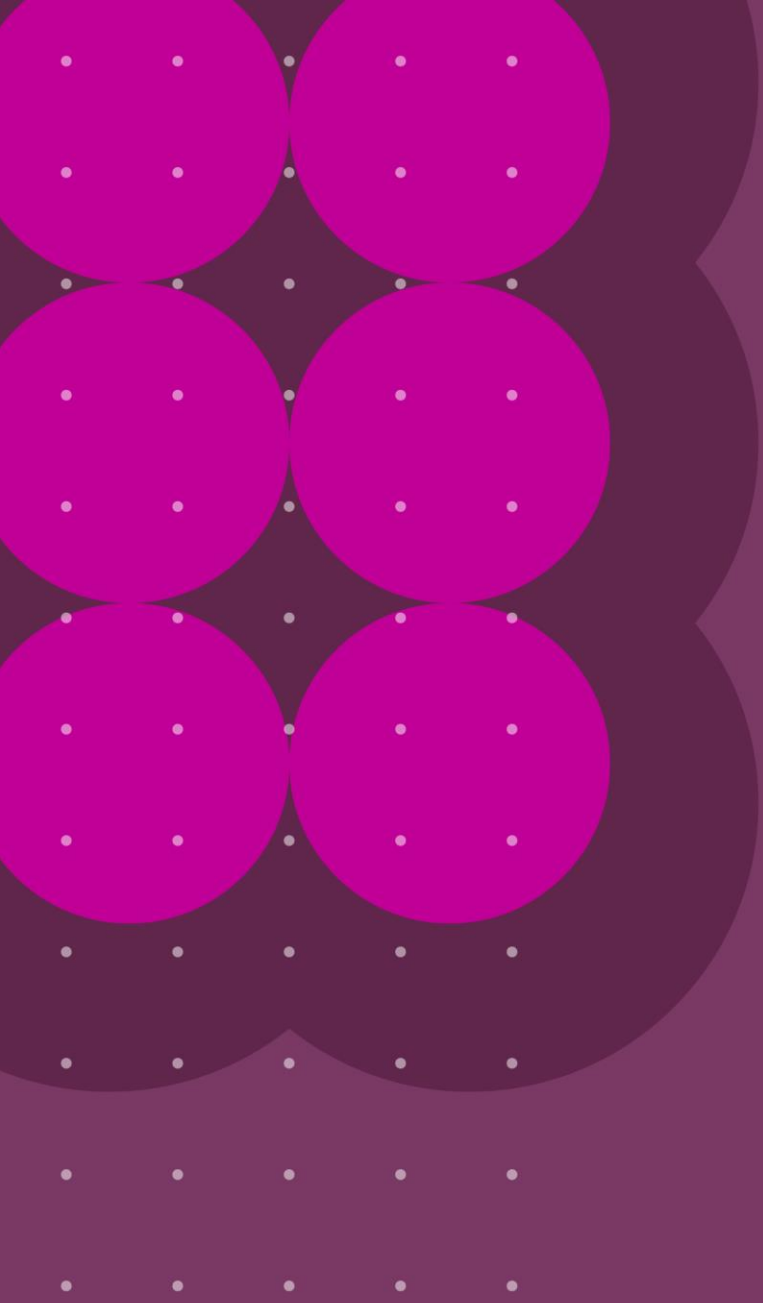
**Scottish & Southern**  
Electricity Networks

## Supported by



CGI





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