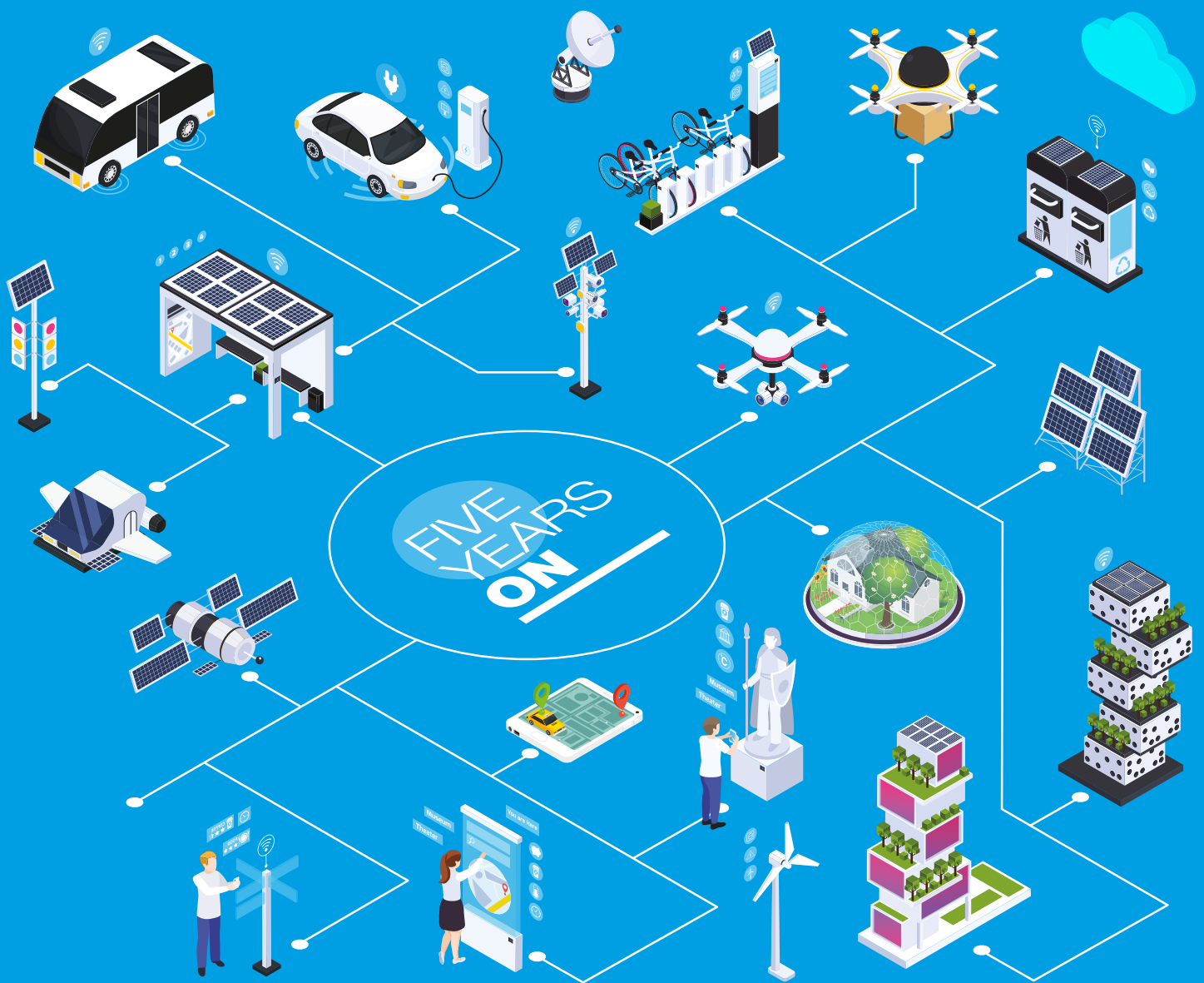
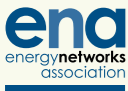
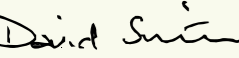

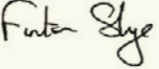





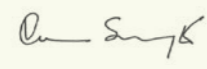





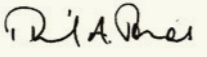

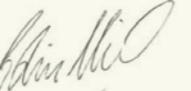

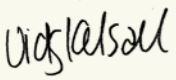

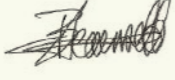
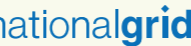



# Open Networks 2022 in Review



# Contributing Partners

 <p><b>David Smith</b> Chief Executive Energy Networks Association</p> 	 <p><b>Fintan Slye</b> Executive Director GB Electricity System Operator</p> 	 <p><b>David Wright</b> Director, National Grid Electricity Transmission Group Chief Engineer, National Grid Electricity</p> 
 <p><b>Clive Linsdell</b> Executive Chairman BUUK Infrastructure</p> 	 <p><b>Ian Smyth</b> Chief Executive Officer Electricity North West</p> 	 <p><b>Paddy Hayes</b> Managing Director ESB Networks</p> 
 <p><b>Derek Hynes</b> Managing Director Northern Ireland Electricity Networks</p> 	 <p><b>Phil Jones</b> Chief Executive Northern Powergrid</p> 	 <p><b>Colin Nicol</b> Managing Director, Networks Scottish &amp; Southern Electricity Networks</p> 
 <p><b>Vicky Kelsall</b> Chief Executive Officer SP Energy Networks</p> 	 <p><b>Basil Scarsella</b> Chief Executive Officer UK Power Networks</p> 	 <p><b>Phil Swift</b> President, National Grid Electricity Distribution</p> 

# Introduction

As economies open up post-Covid, and as governments and energy markets around the world respond to the energy supply crisis triggered by Russia's invasion of Ukraine, the need for smarter, greener and more resilient energy networks has never been more important. These global challenges – coupled with new smarter, greener technologies – are testing the traditional way we generate, consume and manage electricity.



**Dr. Avinash Aithal**  
Head of Open Networks,  
Energy Networks Association

All over the world networks are responding to these challenges and helping deliver these changes, but some are making better progress than others. Successful network operators have recognised that as more renewable generators connect to local grids, historic assumptions about building and operating energy infrastructure need to be rethought. The Ofgem and BEIS Smart Systems and Flexibility Plan reiterates these challenges and progress has been made against smart systems and flexibility plan actions.

In recent years, UK electricity networks have transformed their infrastructure from a one way system to one where energy flows both ways. Their progress has been striking. **The UK has the largest local flexible energy market in the world – a record the UK has kept for the fourth year running – with network companies tendering out for almost 4GW of flexibility services this year.**

Grid infrastructure is also getting smarter. As more and more devices and infrastructure come online that feed data back to networks, this helps them vary energy demand and generation in support of network needs, optimising the available capacity. This smarter, more flexible grid drives efficiencies in existing infrastructure, and removes the need to build expensive new capacity.

Smarter infrastructure can also significantly reduce the cost of meeting our Net Zero goals. In the Smart Systems and Flexibility Plan it sets out that **flexibility could save consumers £10bn per year in energy costs by 2050** and reduce the total cost of the Net Zero transition by up to £70bn. So how can we keep up the pace?

**Now in its fifth year, Open Networks is a major industry programme run by Energy Networks Association (ENA) working with all UK energy networks and industry to lead the transition to a smart and flexible energy system.**

This programme is transforming how our networks operate, with the aim of standardising customer experience and making accessing the flexibility market easier.

In 2022, the programme has expanded to look at how networks can best innovate and remove the barriers to developing a more flexible, smarter grid. This year 28 organisations and over 200 experts have collaborated across six workstreams. Highlights include:

- Delivering key actions identified for Open Networks in the Smart Systems and Flexibility Plan through 12 distinct working groups.
- Enabling more participation in flexibility services by improving the consistency of service delivery and contracts, by taking the first steps to deliver true interoperability between grid systems. Primacy rules are being developed which, when implemented will help to manage service conflicts across markets.

- Improving the way data management works across companies to harmonise how data can be anonymously shared and used to generate insights.
- Improving the transparency of network operators, including more consistent carbon impact reporting, the publication of Network Development Plans (NDP), and the creation of several explainer guides on topics including Common Evaluation Methodology (CEM) that introduce the wider industry to key network processes.
- Supporting the roll out of a whole system cost benefit analysis tool and publishing the first ever whole electricity system 'coordination register' to deliver system wide operational benefits.

I'm immensely proud of the work delivered by the programme in 2022 as it continues to enrich and drive the national debate around ways to enhance energy flexibility and resilience, issues which have become more important than we could have possibly imagined since Russia's invasion of Ukraine. We have shown that, as the scale of challenges in the energy sector grows, so does the pace at which the Open Networks programme delivers, both on the ground in the UK but also by setting the gold standard for other energy markets to follow.

# 2022 in numbers

## A record-breaking year

2022 was a pivotal year for the Open Networks programme, its fifth anniversary and another record-breaking year for tendered flexibility services.



Energising the UK's transition to Net Zero networks

**3.7GW of flexibility tendered out in 2022 – a record amount**, with **2GW** of this contracted by July 2022, maintaining the UK as a European leader in local flexibility markets. This is the equivalent of over 500,000 electric vehicles simultaneously fast charging, connecting 2.8m EV charge points, or providing electricity to over **4 million homes** across the UK, with no new cabling required

An **increase of 31% flexibility services tendered** since last year, and a 76% increase since 2020, spanning **119 of the 129 grid supply points** across the UK, representing **over 90%** of all supply points

**17 consultation responses** from across the industry

**115 deliverables** launched across **6 workstreams** and **24 flexibility working groups**

**2 Community Energy Forums**

**219 industry experts working** with us on a day-to-day basis

**A new approach to industry engagement**

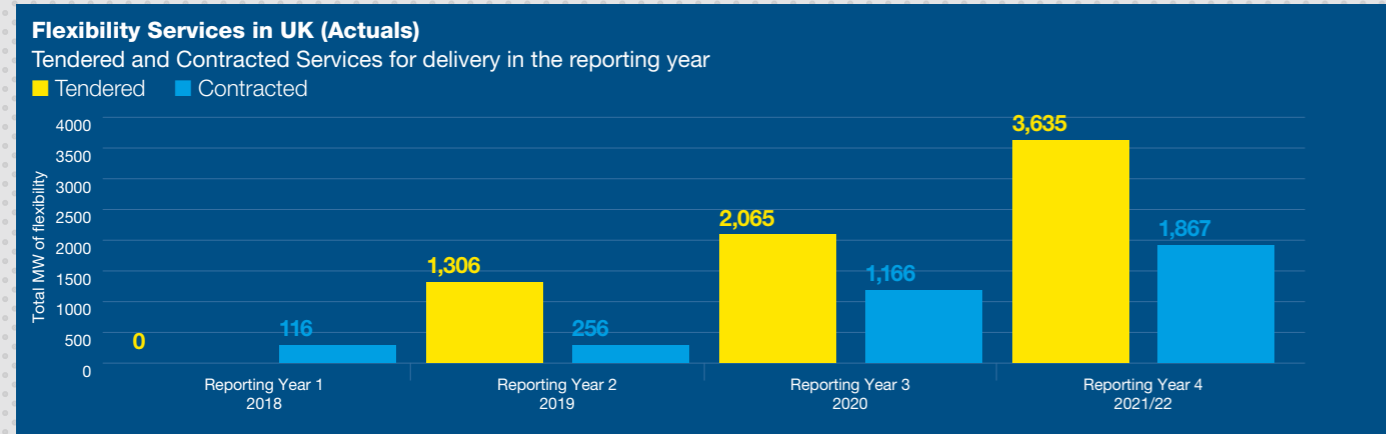
**2 entirely new engagement formats** were created to engage with stakeholders and members in a clear and transparent way:

**5 Challenge Group meetings**, which brought together a group of **19 industry experts** to provide expert direction on our programme

**4 Dissemination Forum meetings**, which demonstrated progress made on flexibility and what was to come.

**129 people** from across **13 countries** and **4 continents** signed up to these events

Continuing our wide reaching programme of events, workshops and webinars



# 2022 highlights

## Key operational achievements and milestones

- Opening Flexibility Markets
- DSO Transition
- Whole Energy Systems
- Customer Connections
- Other notable energy milestones

JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE
<ul style="list-style-type: none"> <li>Launched a code modification <a href="#">DCP-399</a> to revise Embedded Capacity Register (ECR), lowering threshold for entries from 1MW to 50kW</li> </ul>	<ul style="list-style-type: none"> <li><a href="#">FLOWERS project</a> began</li> <li>Launched the first Open Networks Challenge Group</li> <li>Produced a recommendation and <a href="#">cost benefit analysis</a> on improving the operational visibility Distribution Network Operators (DNOs) have over generation sites</li> </ul>	<ul style="list-style-type: none"> <li>Launched a public consultation on CEM and a webinar in partnership with FNZ</li> <li>500 mobile generators donated to Ukraine through the <a href="#">Ukraine Electricity Network Support Task Group</a>, supported by the ENA and members</li> </ul>	<ul style="list-style-type: none"> <li>Introduced the <a href="#">Common Evaluation Methodology</a></li> <li><a href="#">Baseline tool</a> released</li> <li>Ran educational webinars on the CBA tool</li> <li>Government published their <a href="#">Energy Security Strategy</a> in response to the energy supply crisis following Russia's invasion of Ukraine. This included plans for a Future System Operator</li> </ul>	<ul style="list-style-type: none"> <li>Final <a href="#">Shift</a> report published</li> <li><a href="#">BiTraDER project</a> launched</li> <li>Provided an update on the Conflict of Interest and unintended consequences register</li> <li>Released a <a href="#">template</a> for tracking queue management implementation for network operators</li> </ul>	<ul style="list-style-type: none"> <li>Published Dispatch <a href="#">Alignment recommendations</a></li> </ul>
JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
<ul style="list-style-type: none"> <li>2021/22 <a href="#">flexibility data published</a>, showing a record breaking 3.7GW of flexibility services tendered</li> <li>Climate Change Committee publish their <a href="#">annual assessment</a> to Parliament emphasising the need for delivery to match ambition</li> <li>Ofgem publish draft determinations for the RII0-ED2 Price Control, which sets the revenues and outputs for electricity network operators from 2023 to 2028</li> </ul>	<ul style="list-style-type: none"> <li>Published a <a href="#">Common Methodology for Providing Curtailment Estimates</a></li> <li>Published a <a href="#">Carbon Methodology</a> for DNO reporting</li> <li>Published the <a href="#">Annual Flexibility Consultation</a>, which sought feedback to help to improve participation in flexibility markets</li> <li>Installed UK wind capacity reaches 25GW, enough to power 19m UK homes</li> </ul>	<ul style="list-style-type: none"> <li>ENA host their 11th annual <a href="#">Energy Innovation Summit</a> in Glasgow</li> </ul>	<ul style="list-style-type: none"> <li>ENA hosted Open Networks fifth and last challenge group meeting of the year</li> </ul>	<ul style="list-style-type: none"> <li>UK Presidency of COP26 comes to end as world leaders meet in Egypt for COP27</li> <li>Power generated by wind reached 20GW for the first time in UK history, meeting 53% of UK electricity demand</li> </ul>	<ul style="list-style-type: none"> <li>Published the first set of primacy rules for managing service conflict with support of <a href="#">Fusion</a> and other partners</li> <li>Final DSO Implementation plan update</li> </ul>

# Practical innovations to increase flexibility and unlock Net Zero including:

## The Baseline Tool

In April, we released the Baseline Tool, intended to help flexibility providers follow a clear, common and more accurate approach for measuring how much flexibility they have delivered to Britain's Distribution Network Operators (DNOs). The tool is available online, along with an accompanying [User Guide](#).

### Impact

The tool, developed jointly with [SSEN Transition](#), enables a standard and consistent decision-making process across all DNOs, which encourages transparency, more competitive outcomes and participation, as well as increasing stakeholder confidence. The tool means consumers, providers and network operators have a more accurate view of their local flexibility market and can plan accordingly.

## Whole System Cost Benefit Analysis tool

This [tool](#) enables the comparison of costs and benefits across different sectors, stakeholders (regulated and non-regulated), and scenarios.

### Impact

The tool can be used to evaluate options to help achieve Net Zero. This includes assessing the wider societal impacts of different options, considering both current and future consumers and developing a consistent approach to appraise options. After inputting costs and benefits, the tool provides several reporting metrics, including distributional analysis, which can be used to inform a preferred strategy.

## Whole Electricity System coordination register

This [register](#) enables coordination between electricity network licensees and the whole value chain (network companies, local authorities, consumers and consumer groups, retailers, technology firms), to deliver an efficient and effective energy system.

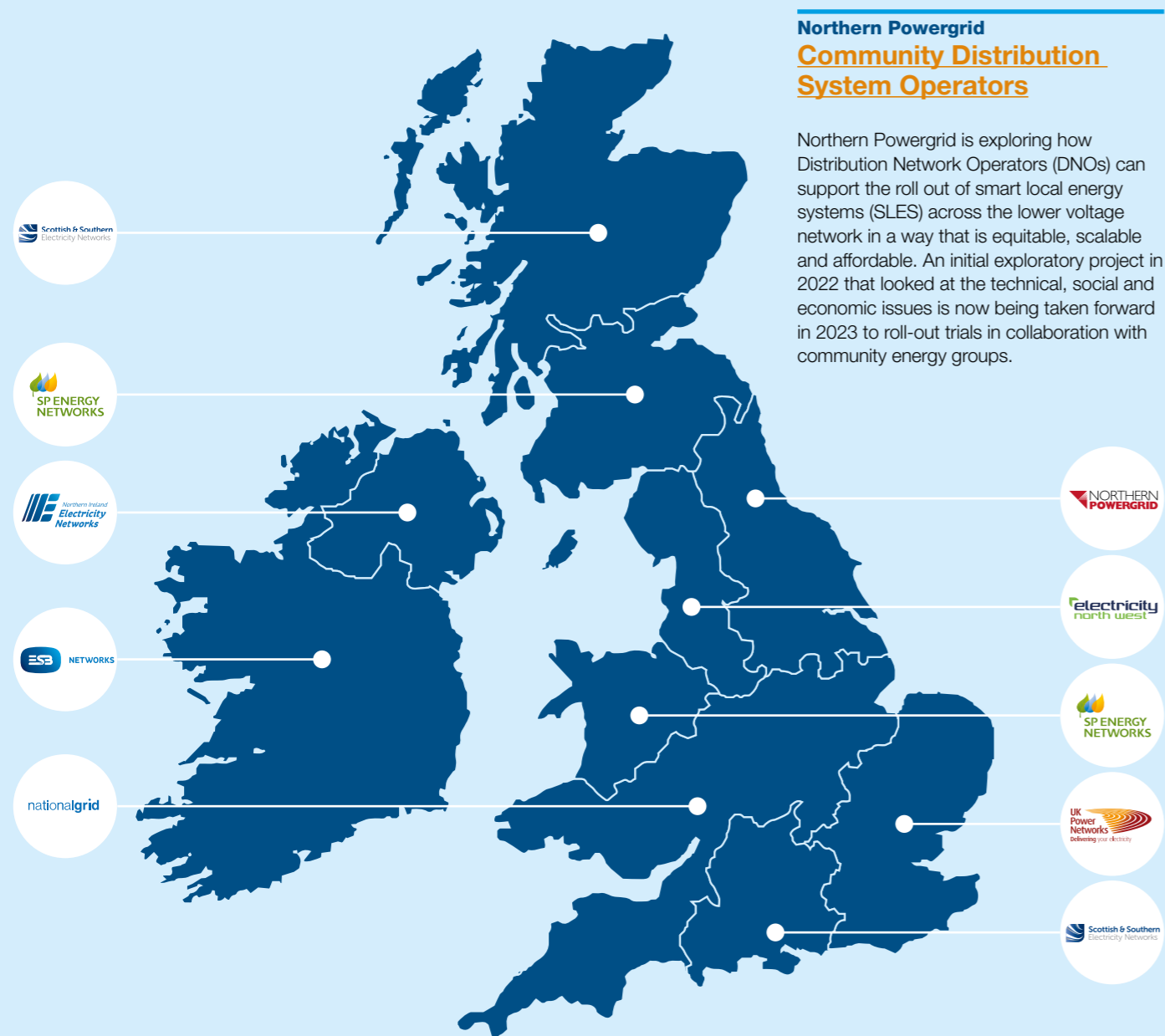
### Impact

By publishing a register, all stakeholders can understand what opportunities have been identified and learn from them, advancing not just the electricity system, but the wider Whole Energy System. This means the Whole Energy System can potentially act more efficiently and collaborate more effectively.



# An overview of our impact

Our members have continued to deliver a wide range of innovative flexibility projects and trials over the course of 2022.



## Northern Powergrid Community Distribution System Operators

Northern Powergrid is exploring how Distribution Network Operators (DNOs) can support the roll out of smart local energy systems (SLES) across the lower voltage network in a way that is equitable, scalable and affordable. An initial exploratory project in 2022 that looked at the technical, social and economic issues is now being taken forward in 2023 to roll-out trials in collaboration with community energy groups.

# Case studies

## National Grid FLOWERS project

In February 2022, National Grid launched the FLOWERS (Flexible Operation of Water Networks Enabling Response Services) Project, in partnership with South West Water (SWW), to explore energy efficiencies and flexibility options in the company's operations and how they can be used for the mutual benefit of National Grid and customers across both businesses.

As water companies are one of the largest energy users on the electricity network, the FLOWERS feasibility study is looking at ways to balance SWW's demand for electricity with the needs of the local electricity network. A final report and recommendation document is due to be released before the end of the year.

## UK Power Networks Shift trial

UKPN produced the final report of their Shift trial in May 2022. Project Shift stimulated a market for smart EV charging and explored the efficacy of these solutions, leading to the world's first low voltage flexibility tender and the UK's first contract with EV service providers.

Collaboration with customer-centric partners on Shift led to the development of several customer propositions, which were adopted by over 2,500 domestic customers during 12 month trials. Securing contracts directly with EV service providers, UKPN has now procured 248MW of capacity from EV batteries through the use of smart charging solutions.

## Electricity North West (ENWL) BiTraDER project

Launched in May 2022, this project is an entirely new way of encouraging energy flexibility, bringing opportunities for customers to trade flexibly between themselves, while generating income. It aims to reduce barriers to the connection of low carbon generation on the network, boost value for connected resources, and bring down whole system costs by adding value to the flexibility market.

It could provide a benefit of £35.5m for the North West region by 2050 and, if rolled out nationally, the benefit could reach £581m.

## Scottish and Southern Electricity Networks (SSEN) Project LEO

SSEN has been working with key local and industry partners on Project LEO (Local Energy Oxfordshire) to deliver one of the most wide-ranging and holistic smart grid trials ever conducted in the UK, testing electricity network flexibility models and markets across Oxfordshire.

Project LEO is exploring how the growth in local renewables, EVs, battery storage, vehicle-to-grid technology and demand side response can be supported by a local, flexible, and responsive electricity grid. This is to ensure value for consumers and opportunities for communities as well as market providers.

## SP Energy Networks (SPEN) Flexibility Demand Shift Trial

SPEN have successfully led the UK's first trial to shift electricity demand to maximise local network capabilities and allow customers to capitalise on the opportunities from a transition to a smarter grid.

Working with Octopus Energy, customers were able to respond and shift when they used electricity to time slots when the supply of renewable energy was at its highest. This helped to balance the demand of the network in their local community.

## National Grid ESO Crowd Flex

Building upon two pioneering projects (CrowdFlex: NIA and the Domestic Reserve Scarcity Trail); this project seeks to understand and align ESO and DNO requirements for domestic flexibility services and develop commercial frameworks suitable for the statistical nature of flexibility.

It explores how domestic flexibility can be used in grid operations to help align demand to generation, improve coordination across the network and reduce stress on the system, while empowering consumers to be active players in reducing their energy bills via new tariffs and incentives.

# Looking ahead to 2023

2022 marked a key moment for the Open Networks programme, its fifth anniversary. This year we facilitated record levels of flexibility services to the grid and continued to progress key aspects of the joint BEIS and Ofgem's Smart Systems and Flexibility Plan.

Through our Community Energy Forums, and the newly introduced Dissemination Forums and Challenge Groups, we have listened to voices across the whole energy industry who clearly told us that they want the Open Networks programme to provide:

- A consistent user experience through streamlining various processes
- Improvements to market liquidity to enable even more participation and more savings for consumers
- More and improved data sharing to increase collaboration and visibility of network connected assets
- Improvements to network process transparency to further improve collaboration and visibility

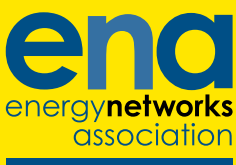
- Strategic oversight for the flexibility market as an industry leader
- Continued industry support to help them deliver Net Zero through initiatives like grid access queue management, the publication of grid network development plans, the whole electricity coordination register and carbon impact data.

Taking this on board, 2023 looks set to be our busiest and most exciting year yet as we introduce a number of projects and working groups to step up our ambition. We will address our stakeholders' feedback and refocus our activities around delivering tangible outcomes.

This includes a common system-wide framework for flexibility which is due to be introduced in early 2023, as well as a pivot to focus on testing more in depth practical innovations and completing several strategic projects, such as:

- Implementing the [ESO - DSO primacy rules for flex service conflicts](#)
- Exploring Application Programming Interface (API) standards to achieve interoperability of systems across organisations.

**For further detail on the Open Networks programme's priorities and what's to come in the year ahead, please visit [our website](#).**



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