



SMART OPTIMISATION OUTPUT: COLLABORATION PLAN

May 2024

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1. Executive Summary

The Smart Optimisation Output (SOO) is aimed at promoting and enabling effective collaboration between UK Power Networks and our local stakeholders and communities, leading to better network planning and more coherent local and regional planning for Net Zero. This report details the UK Power Networks Collaboration Plan, covering both the strategic and tactical actions for enhancing the effectiveness of cross-sector collaboration strategies and sharing data through our System Visualisation Interface and Open Data Portal.

We published our System Visualisation Interface (SVI)¹ in 2023 which sits within our Open Data Portal, providing a visual geographic representation of many of the key datasets which are hosted on the portal – this includes our infrastructure, low carbon technologies (LCTs) connected to our network, headroom, and flags from our Distribution Network Options Assessment (DNOA). Throughout this plan we describe datasets which are accessible through this interface and those which are part of the wider portal to underscore the ways that stakeholders can access our data to support optimisation across our network.

Emphasising the importance of stakeholder feedback, the report also underscores the necessity for us to continuously measure the effectiveness of our Collaboration Plan and SVI. By actively engaging stakeholders, including users of the SVI and our other published datasets, we gather valuable insights to refine our strategies and improve outcomes. This report highlights the key role of stakeholder engagement to develop the SOO, supported by our cross-organisational and cross-vector collaboration.

2. Introduction

UK Power Networks is the UK's biggest electricity distributor, delivering power to over 8.5 million homes and businesses across London, the East and South East of England. We keep the lights on across 29,250 square kilometres, serving 19 million people from Cromer in the East to Brighton on the South Coast. A key part of our vision is to 'Enable the Net Zero Transition For All'. This means ensuring we have right electricity network capacity, at the right time and in the right place – at lowest cost.

The landscape of electricity networks in the UK is undergoing a transformation with a significant amount of generation connecting into the distribution network over the last decade. This is set to continue in the future with the increasing pipeline of distributed generation and battery storage connections. Current forecasts indicate at least a doubling of electricity demand by 2050, while the electricity sector has committed to decarbonise by 2035. Decarbonisation of heat and road transport will see millions of electric vehicles and heat pumps connect to our network in the next few years, along with grid-scale renewables and batteries. Decarbonisation of industry, ports and shipping and the proliferation of data processing centres could present further demand growth in particular locations. On the other hand, energy efficiency, improved demand response and flexibility offerings offer major potential to reduce energy use and spread demand over time, limiting the required peak network capacity. Taken together, these trends present a huge shift in the volume and nature of distribution network utilisation. In the backdrop of all this is our traditional electricity grid that needs to enable this transition, presenting an increasingly complex challenge for us to plan, design and operate the network.

As UK Power Networks, we consider smart optimisation to be central to our way of working as a modern energy network and system operator. When we launched the UK's first independent Distribution System Operator (DSO) last year a core ambition for this new business function was to deliver excellent service for our customers and facilitate Net Zero through an efficient electricity network. Both the DNO and DSO remain responsible for keeping the lights on and meeting wider demand growth, but we must also act in the interests of customers to ensure robust, informed challenge of the size of the network required to do this and the role that flexibility, data and technology can play in keeping costs down.

Our DSO Forward Plan introduced a set of customer personas to help us think about our diverse customer base, ensuring that we consider how our strategies and plans impact different network users. As explained therein, these personas represent the different types of customers who regularly interact with the DSO – each with their own unique motivations and challenges. The personas range in size from a large flexibility aggregator to a single residential electric vehicle (EV) owner, and as such, we are working and engaging with all of them to optimise our network and service offerings. Throughout our discussion of smart optimisation, we stress the importance of serving our stakeholders and the ways in which we are developing new tools to better meet shifting needs across our network.

¹ Annex A provides an overview of how our System Visualisation Interface fulfils the expectations set out by Ofgem.

Aligned with this we are expanding the data we share with stakeholders through daily operational plans and enhanced outage forecasting. We are also launching new products and services – like the new day ahead flexibility market – which allow flexibility providers to play an even bigger role in our short-term planning.

This report covers our strategy and initiatives describing how we are meeting and exceeding the core requirements outlined in the Ofgem guidance document.

3. Our Strategy and approach to Smart Optimisation

Smart optimisation across the energy system has been defined by Ofgem as “utilising network data to improve decision-making on all aspects of network functions, particularly with respect to Load Related Expenditure (LRE), the establishment of DSO functions, and collaboration with local stakeholders”.

To serve our diverse customer base, a range of strategies, plans and initiatives are central to our work on smart optimisation across the network. The [Digitalisation Strategy and Action Plan](#) (DSAP) highlights our view that digitalisation is critical for decarbonisation, underscoring our commitment to harnessing data to plan and innovate across the network. The [Distribution Future Energy Scenarios](#) (DFES) is an important forecasting output which we are expanding to become even more locally informed. Our [Local Net Zero Hub](#) and [award-winning work](#) is helping local authorities to plan for Net Zero, while also strengthening decarbonisation through our network and informing our own understanding of where LCT demand is likely to grow. Additionally, we are spearheading initiatives to coordinate across energy vectors, including through innovation projects. These are a few examples across the many outlined in further detail throughout this report.²

Smart optimisation at UK Power Networks integrates these strategies and plans into a central ambition to harness the wide array of data and insights available to efficiently plan our network, meet our customers’ needs, and collaborate with stakeholders to support ambitious decarbonisation across the network, including through local energy planning.

Our approach to smart optimisation is split across three timescales: (i) long-term, (ii) short-term, and (iii) operational. By optimising over these time-horizons, we facilitate smart optimisation and effective strategic decision making. While planning years ahead ensures that our long-term investment choices and network reinforcement plans align with our modelling to meet real-world needs, our short-term forecasting focuses on providing immediate value to customers via our flexibility-first approach. Lastly, our operational optimisation keeps the lights on reliably and sustainably.

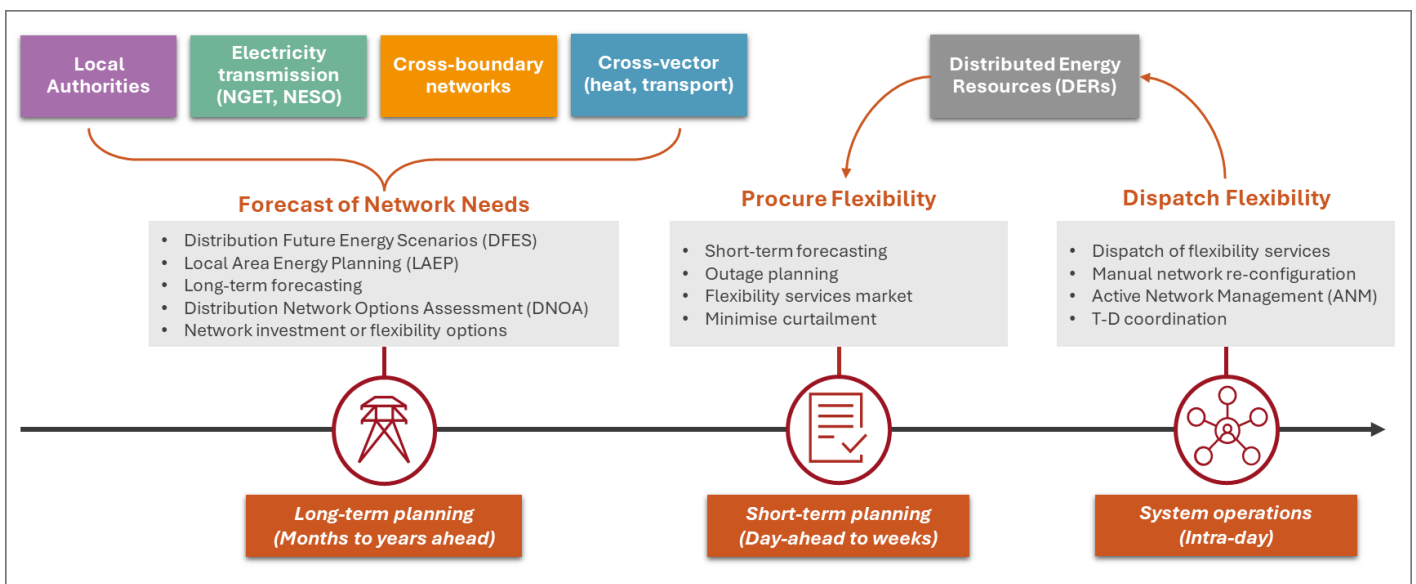


Figure 1. Key optimisation actions across three time horizons

Throughout ED2, we will continue to expand the data sources we make use of in this process including local energy planning insights to support our forecasts. Below we provide an overview of our work across these timescales and Section 5 highlights ways we are bolstering collaboration and using new data sources throughout this process.

² Table of our most important strategies and initiatives related to the SOO is presented in Annex B.

(i) Long-term Planning: optimisation months to years ahead

The nature and scale of network investment necessitates the longer timescales that we use in our DFES forecasting and the DNOA process that provide a highly detailed long-term view of our network needs. This helps set priorities for both our own investment planning and provides assurance and guidance to stakeholders for their own planning purposes.

Our planning process starts with the creation of our annual DFES forecasts. Here we have developed bespoke bottom-up scenarios which align to the four pathways used in the Electricity System Operator's (ESO) Future Energy Scenarios. By developing with local knowledge, we can more accurately reflect UK Power Networks' region, the customers within this region and the deployment of LCTs. From these scenarios we choose one high confidence forecast to use as a "best view" scenario for planning based on alignment with existing/planned policy, stakeholder feedback, and alignment with regional and local characteristic inputs.

We enhance our DFES forecasts with local intelligence through our close collaboration with local authorities through our dedicated [Local Net Zero](#) team. To further strengthen these partnerships, we have launched new tools designed in partnership with local authorities to make sharing local plans easier and more efficient at all stages of local energy planning. As discussed further in Section 5.5, these updates include creating a dedicated [LAEP Open Data Page](#) providing easy access to **170 datasets** prioritised by local authorities to support decarbonisation plans. Further, our [Your Local Net Zero Hub](#) is the first digital tool to be designed in partnership with local authorities and is open to all local authorities across UK Power Networks' entire licence area. The tool enables local authorities to combine their decarbonisation strategies, local market trends, transport plans and social inclusion policies with network infrastructure data to develop options for their communities.

Our DFES forecasts for LCT uptake feed into our long-term forecasting platform – the [Strategic Forecasting System](#) (SFS). This software tool allows us to allocate the granular technology uptake from the DFES to our network topology across all voltage levels (including LV feeder). From there, we aggregate the usage profiles for different technologies and customers at each LV feeder to establish a unique energy profile for each network feeder. We then build our Planning Load Estimates (PLEs), a set of bottom-up load forecasts up to our highest voltage substations. We are continuously revising the inputs to this forecasting through updated technology profiles in the SFS and expanded coordination with local energy planning, including via a locally enhanced scenario for our next round of DFES forecasts.

The forecasted load is then used to identify areas of the network with minimal headroom which will need to be managed either through flexibility procurement or traditional reinforcement. Aligned with our ED2 business plan, we have adopted a flexibility-first approach to reinforcement where feasible. This commitment is at the core of our DNOA process wherein the DNO and DSO work together to cost both flexibility procurement and reinforcement for each identified system need. We use the industry developed Common Evaluation Methodology (CEM) Cost Benefit Analysis and publish reports on the DNOA in each of our licence areas to make sure that our planning is as transparent as possible. The DSO team collaborates with expert stakeholders across the business to ensure that decisions taken are realistic and focus on the customer experience. Transparency across the planning process also helps our customers and flexibility providers to optimise their investments / planning.

Throughout this process the DSO works with its own independent [Supervisory Board](#) to ensure that we are delivering on our RII0-ED2 business plan **commitment to deliver a £410m reduction in load related expenditure** through increased competition and use of flexibility. Our use of transparent data across this process makes our forecasts more robust and allows us to better understand and manage any network needs.

(ii) Short-term planning: optimisation days to weeks ahead

We have established the DSO Operations team based directly in our Control Room, comprising of both power systems and customer service skills. The power systems team work closely with the outage planning team to optimise network operation from day-ahead to weeks-ahead timescales, allowing optimisation in short-term network functioning.

A key part of this optimisation is providing as much data as possible to our distributed energy resource (DER) and curtailable connections customers, so that they can plan and optimise their own operations given the forecasted constraints on the network. For these customers, we publish a Daily Operational Plan which gives DER operators better visibility of our planned activities and outages. With these daily insights generators can plan their operations to maximise their generation and revenue, contributing to our low-carbon network ambitions.

For maintenance, we often must take planned outages on the extra high voltage network, and in these cases firm customers (who are therefore not usually subject to curtailment) may be shut off to protect the network in areas where the network is

operating below expected capacity level. To reduce the impact to customers of this maintenance we have built an internal tool which forecasts customer output on the affected portion of the network. If the total forecasted generation is less than the constraint all customers can be allowed to generate without damaging the network. At one site, Kings Lynn, the use of this new tool has **avoided 4,682 tonnes of carbon emissions** allowing seven renewable generators access to the network over a twelve-week period, amounting to an approximate value of **£2 million in savings for customers in otherwise lost revenue**.

To further bolster our ability to plan day-ahead, we launched the [UK's first day-ahead flexibility product at the distribution level](#) in March 2024. This new initiative is the direct result of stakeholder requests to participate in local markets closer to real time and will support the resolution of real-time system needs on the distribution network.

(iii) System operations: intra-day optimisation

Real-time optimisation is central to our network operation responsibility and a large part of optimisation in this role is ensuring that our flexibility services are used efficiently and transparently in our Control Room. As part of the new [DSO Operations function](#), we have also established the first and only dedicated DER customer service team, providing 8am-8pm, year-round support. Our DNO Control Room engineers manage all of our network infrastructure 24 hours a day, 7 days a week, ensuring our customers have a safe, reliable and efficient electricity supply. The DSO Operations team works alongside the DNO Control team which supports our DER customers to ensure that flexibility services are effectively dispatched and monitored for our flexibly connected customers.

Our world-leading approach to using a Distributed Energy Resources Management System (DERMS) is an important step forwards in managing our curtailable connections, using a combination of centralised and distributed intelligence to manage the export of distributed generation into constrained areas of our network. We are continuously enhancing and developing the functionality of the system and have a [set of expanded capabilities planned for release](#) in ED2.

One of these updates to DERMS and our real-time optimisation is our updated data sharing with the ESO through the [MW Dispatch programme](#) (discussed more in Section 5.1). Through this programme, participants in DSO flexibility services help to alleviate transmission constraints in real time and improve coordination in scheduling and dispatch between the ESO and DNO.

4. Our core principles for Smart Optimisation

Throughout this document, we share how we align our smart optimisation practices to meet the core principles, listed below.

- Facilitate meaningful collaboration with local stakeholders by making strategic development data more accessible, transparent, and interoperable.
- Support a least-cost, optimised, and integrated Net Zero future energy system with connected market participants.
- Make data available, present a future vision, and collaborate to support least-cost whole system pathways.
- Ensure operating strategies and investment plans are informed by stakeholders and insights from their local location-based future load data.
- Support stakeholders to gain a better understanding of the electricity distribution network in their area, facilitating further collaboration via Local Area Energy Plans (LAEPs), regional energy planning and whole system optimisation across different energy vectors.
- Leverage digital tools and strategic programmes to increase effectiveness of collaboration, facilitating local stakeholders to access and extract data that can be overlaid with other datasets within the whole system.

These principles align directly with points 1.5 - 1.10 of Ofgem's SOO Guidance.

5. Details of our Collaboration Plan

5.1. Our approach to sharing data with stakeholders, and how we are taking account of local stakeholder plans to inform our own strategic network planning and smart optimisation activities.

We have set out our commitment for UK Power Networks to be Great Britain's leading DSO in data provision. We recognise that as the energy landscape evolves, it necessitates deeper engagement with various stakeholders, including flexibility providers, local authorities, and DER customers. Recognising the interdependence among these stakeholders, we acknowledge the importance of understanding their needs, challenges, and actions. By fostering mutual understanding, we

aim to facilitate informed decision-making across the energy ecosystem. This section describes how we are enhancing our strategic network planning capabilities and smart optimisation activities by (i) proactively investing and innovating in making data accessible to our stakeholders and (ii) capturing local energy requirements and other key data insights to feed into our network plans.

5.1.1 Our approach to sharing data with our stakeholders.

The DSO has adopted a proactive strategy of data and information provision, with a dedicated Open Data team responsible for engaging with data users and delivering on requests. The Open Data team actively engages customers to identify the most valuable datasets held by UK Power Networks and takes steps to release this data to the public on our [Open Data Portal](#). This includes sharing comprehensive data on asset types, locations, connection types, capacity utilisation, constraints, planned investments, and interventions. Embracing [Ofgem's Data Best Practice principles](#), we ensure easy access to information, fostering understanding and enabling customer influence on plans through platforms like our [DSO website](#) and annual [Forward Plan](#). By sharing extensive DSO data via our SVI and Open Data Portal, we support the adoption of open data platforms and foster collaborative learning within the energy sector.

An important part of making this data as useful as possible is the standardisation of a [Common Information Model](#) (CIM). Cross-industry efforts to develop a CIM have helped to build a platform for enhanced collaboration, facilitating seamless access and integration of data from across the energy system. This integration enables local stakeholders to effectively extract and utilise data for informing comprehensive cross-vector and whole-system plans.

Publishing network data via our System Visualisation Interface and Open Data Portal

Our [System Visualisation Interface](#) shows the locations and key details of our overhead network (lines, poles and towers), substations (at all voltage levels) and where existing demand or generation connections are in place, to provide a transparent and easily-accessible overview of our network. Each map layer is already hosted on our [Open Data Portal](#) with planned update regimes, metadata and clear licencing guidance. The portal features one of the UK's largest sets of information about the electricity network and brings together thousands of datasets from a vast range of sources to provide visibility of our network assets. Through regular engagement we are translating these high volumes of data into meaningful insights that have the greatest value to users. Examples of this engagement can be found in Annex C.

Among the datasets released during 2023/2024 are historical operational data for the 132kV network, records of every use of paid flexibility on the network, and curtailment histories for non-firm connections. We also publish smart meter installation volumes at a local authority level every month to help inform the public about the smart meter roll out on our network, recognising the crucial role of smart meters in DSO operations.

The portal is aimed at meeting customers' evolving needs and interests, providing a wide array of datasets that are leveraged by stakeholders for a breadth of initiatives to deliver new, innovative services to the energy market. For example, the Greater London Authority uses data on proposed street and roadworks in its Infrastructure Mapping Application to identify collaborative street work opportunities and reduce disruption across the capital while a renewable software developer uses the data to identify constraint areas on the network to support grid connection analyses. Further examples are presented in Section 5.7.2 and a full list of these data [reuses](#) is available on the portal.

A full list of datasets is available on the portal's [data catalogue](#) with a few examples presented in Annex D. Figure 2 below shows the 37 datasets published and planned for release under our [data roadmap](#). The portal also includes a specific hub for local authorities to support the creation of local Net Zero plans which is discussed in more detail in Section 5.5.

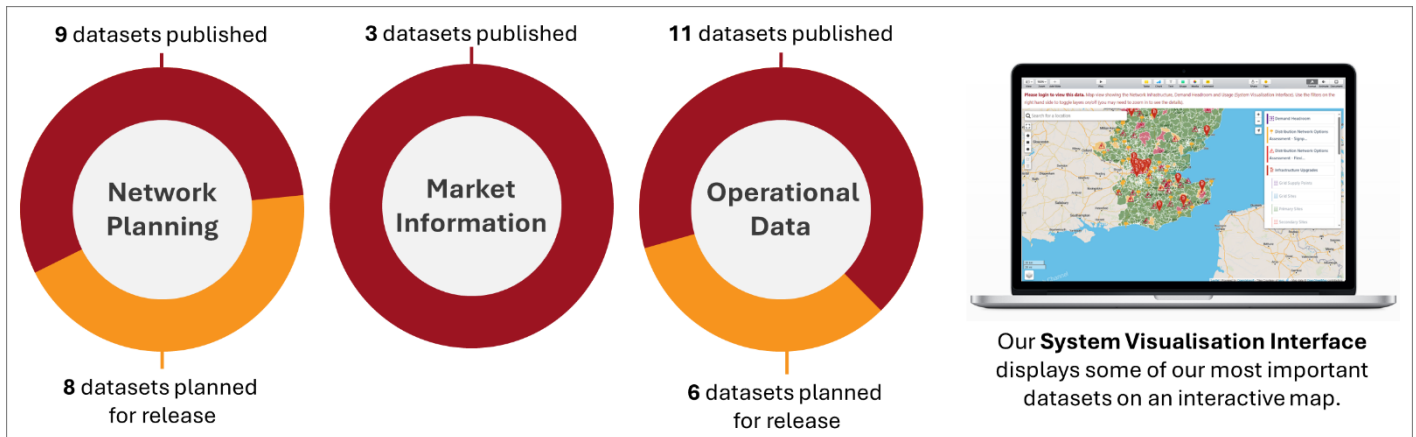


Figure 2. DSO data roadmap and SVI

Publishing network operational data

Connections Data

Our [Network Operational Data Dashboard](#) (NODD), published in late 2023, is an industry-leading tool, offering unprecedented transparency into connection queues. Granular historical power flows are presented alongside an up-to-date view of the connections queue, enabling energy developers and operational network users alike to immediately get a picture of network usage and capacity availability on an asset-by-asset basis. The NODD is a part of the DSO’s efforts to unlock capacity and accelerate connections through robust data analysis and sharing. Sharing this data with stakeholders is the first step in working to develop new flexibility services and further enhance our ability to operate the network dynamically, connect customers faster and reduce our reliance on traditional reinforcement.

The dashboard provides real-time updates on customers' queue status, including readiness for connection and need for reinforcement. By allowing customers to monitor their own queue status and others', the tool supports those looking to connect in choosing a site which best fits their connection needs – feeding into the optimisation of planning across the network.

Curtailment Data

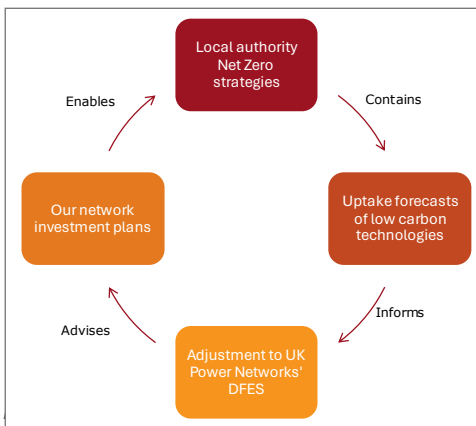
Transparent curtailment data is essential for instilling confidence in investors and renewable energy projects. To further serve this need, we are developing a web-based curtailment assessment tool, allowing users to investigate curtailment rates on different parts of the network. Through this tool, users will be able to input their own knowledge and assumptions, such as removing non-viable projects from the connections queue thereby, optimising the connections and capacity management process. The tool will be used internally to generate enhanced curtailment reports for curtailable connections applicants, and will be launched for external, self-serve use later this year.

5.1.2 How we are engaging with stakeholders to incorporate local planning into our network planning process

As the local landscape shifts towards electric vehicles, heat pumps and distributed energy resources continue, our network planning will increasingly need to consider decarbonisation plans across the region to account for evolving customer needs.

Building local energy planning into network planning

Local authorities have a key role to play in delivering Net Zero, influencing over 80% of the UK’s carbon emissions according to the [Climate Change Committee](#). The majority of decarbonising actions depend on the take up of LCTs. Several local authorities across our regions have set ambitious targets to decarbonise and are now creating plans to meet those targets. Of the **133 local authorities UK Power Networks serves, 80% have declared a climate emergency and 88% have ambitions to be Net Zero or carbon neutral before the national Net Zero 2050 target.**



We established a dedicated DSO Local Net Zero team to proactively engage and collaborate with our 133 local authorities on their regional, or local climate change action plans including LAEPs. Through this collaboration, local authorities share their planned decarbonisation activities (e.g. plan for the deployment of electric vehicles), that use to enhance our forecasts with their local intelligence using our stakeholder-endorsed [LAEP Framework](#) to shape our network investment plans to ensure we are providing a fit for purpose electricity network that facilitates local decarbonisation plans.

The team has already created a diverse set of tools, datasets, and engagement programmes which are discussed further in Section 5.5 to make it easier for local authorities to share their plans with us no matter where they are in their decarbonisation planning journey.

Alongside these efforts, the Local Net Zero team and Network Insights team at the DSO is working to incorporate the insights from the local planning into our own forecasting and planning initiatives. One significant advancement in 2024, is we will be integrating our DFES with the most up-to-date local inputs to create a 5th “Locally Enhanced” scenario. This enhanced scenario will use additional inputs from those local authorities who have provided well evidenced, data driven, decarbonisation plans and serve as the foundation for our network planning in the upcoming years.

The SFS, UK Power Networks’ long-term forecasting platform, has also been expanded this year to analyse the network impact of LAEPs. The new module allows us to evaluate the projected impact of a local decarbonisation plan down to the secondary substation level to support coordination between UK Power Networks and local stakeholders. While network investment has historically been driven by our connections applications and long-term forecasting, this new methodology will allow greater local influence on planning and investment in the network.

Load forecasting from London’s transport network

One instance of local coordination is our successful and longstanding relationship with Transport for London (TfL). In this collaboration, TfL forecasts London Underground’s peak power demand for the following seven years across eight of our Extra High Voltage substations. These forecasts are then fed into the SFS to inform our identification of system needs which ultimately impacts the [DNOA](#) (where we make decisions on where we can procure flexibility to secure the reliable functioning of the network or where upgrades are needed to keep pace with shifting demand) and the [Network Scenario Headroom Report](#) (the data is available on our [Open Data Portal](#) to help stakeholders optimise their own planning decisions). The DFES also uses TfL’s licensing data on taxis and private hire to inform London-specific forecasts for electric vehicle uptake in this sector. In 2024, we proactively engaged with various teams within TfL such as power systems, Environment and Sustainability teams to further understand TfL’s broader plans for the electrification of London buses, trams, electric bikes and depot heating systems. This included assessing smart solutions to optimise the use of existing capacity such as implementing timed connections that started from Waterloo all-electric bus garage in 2016.

Working across the whole energy system

The [Whole Systems Register](#) (updated annually and discussed further in the next section) shows additional individual instances where UK Power Networks has consulted or collaborated with stakeholders, including local authorities, other energy networks, and large energy users. It gives an overview of some of the coordination activities that we undertake to support Net Zero across the network and GB. The **count of collaboration activities in the 2024 publication is expected to rise to around 70, up from 47 in 2023**. This includes coordination with other electricity network licensees, and more generally solutions arising from working and coordinating collaboratively across the whole value chain (network companies, water and wastewater companies, local authorities, consumers and consumer groups, retailers, technology firms, etc.) to deliver wider societal benefits, as well as to meet our core objectives of delivering low cost, secure electricity to our customers.

5.2. Our approach to considering boundaries and interfaces and how we are working across different energy vectors, including heat and transport, to facilitate whole system optimisation.

The modern energy landscape extends beyond traditional electricity grids to encompass diverse forms of energy, including heat and transportation. By leveraging advanced data analytics and innovative technologies, we strive to optimise the utilisation of resources and infrastructure across these boundaries. Whole systems thinking in its widest sense is fundamental

to facilitating the achievement of Net Zero at the lowest whole system cost for society and is a key part of UK Power Networks’ open data and optimisation efforts across the DSO and DNO.

5.2.1 Our approach to considering boundaries and interfaces.

UK Power Networks partners with neighbouring distribution and transmission networks to align decisions to best serve customer needs. We share two borders with other DNOs – Scottish and Southern Electricity Networks (SSEN-D) to the west and National Grid Electricity Distribution (NGED) to the north and interface with over 14 independent distribution network operators (IDNOs). Coordination activities with the transmission network owner (National Grid Electricity Transmission) and the ESO are also critical to maintaining the smooth functioning of our network. Across these boundaries, we coordinate throughout our network planning process and are working to build and improve real-time data sharing initiatives to identify and manage constraints and faults.

Coordination with other distribution networks

Our coordination with other distribution networks and system operators is crucial to supporting local energy planning as well as our core network planning activities. This work is key to supporting customers who connect at or near these boundaries and ensuring efficient data sharing across GB electricity networks. The table below provides an overview of some of these coordination activities and a further list can be found in our [Whole Systems Register](#) which is updated annually on our website.

Table 1. How we are working with other distribution networks

Initiative	Description
ENA coordination to support Net Zero planning	We lead a working group to coordinate local energy planning between local authorities and networks, a partnership underscored in the report ' Collaborating for local net zero planning and delivery ', which emphasises the pivotal role of this collaboration.
Oxfordshire executive steering board and energy planning working group	Oxfordshire is served by UK Power Networks, NGED, and SSEN-D and coordination across networks through the steering board is expected to support efficient regional planning for Net Zero.
I-DNO monitoring and coordination	Installing monitoring equipment on independent distribution networks to exchange real-time data which will feed into our systems to manage and establish curtailable connections on their network.
Data Exchange Working Group	We are working with other DNOs to improve data-sharing with other DNOs and IDNOS through the proposed Engineering Recommendations (EREC) G111 these new data flows will support improved modelling and proactive fault identification.

Coordination at the transmission-distribution (T-D) and system boundary

Regional Development Programmes

[Regional Development Programmes](#) (RDPs) are an important point of collaboration between UK Power Networks, National Grid Electricity Transmission (NGET) and the ESO. These projects identify where network constraints are preventing customers from connecting to the network and aim to provide tools and resources to help. This allows DERs to connect faster, ahead of reinforcement which, in some cases, is planned for over a decade into the future. Fortnightly meetings between the DSO Regional Development team, the ESO and NGET facilitate a transparent and collaborative approach in developing these initiatives.

Data sharing with the ESO for MW Dispatch service

We are pushing the boundaries in the industry for whole system optimisation by implementing industry-leading data exchange with the ESO to provide mutual visibility of actions for ESO’s [MW Dispatch service](#). Through coordination and data exchange with our control room, this solution will enable ESO to instruct DER units to reduce their output at times of system constraint, while our DSO dispatches the DER. This is enabling the implementation of primacy rules to make DERs available when they are required for the use of Distribution network. This solution enables customers to receive constraint payments for the electricity they would have otherwise generated. This will, in turn, provide a cheaper alternative to the existing constraint management process used within the balancing mechanism, helping to reduce costs for consumers. The data exchange includes data sets from one week ahead, day-ahead and on various points during the intra-day time window as, illustrated in Figure 4:

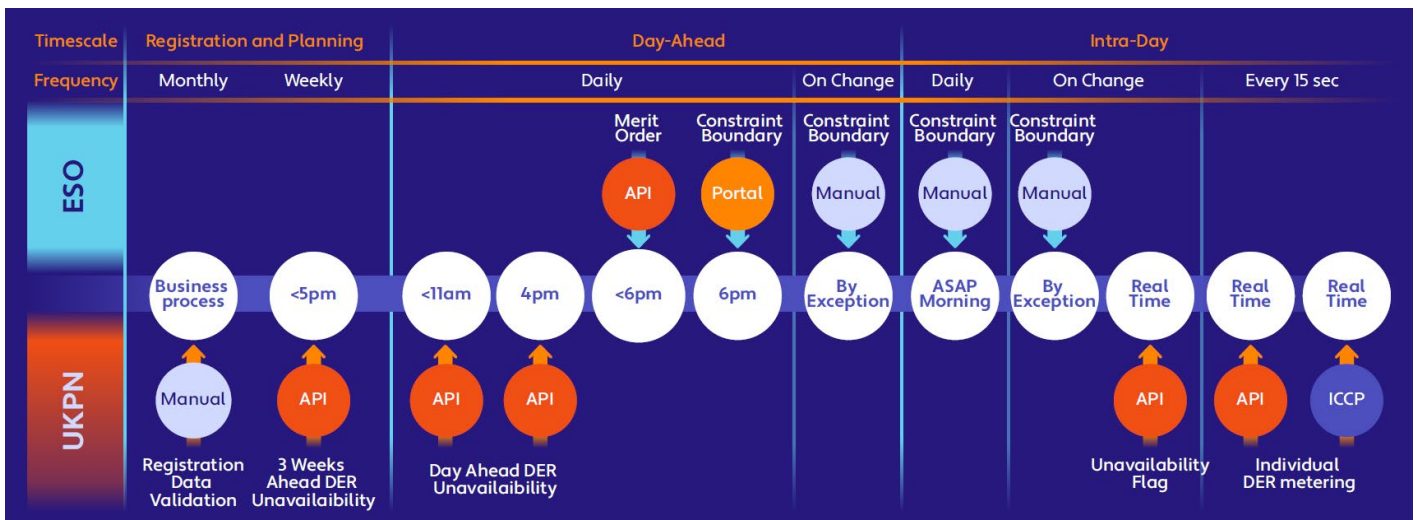


Figure 4. Data exchanges through the MW Dispatch programme

‘Implementation of the MW Dispatch service will support Network Operability in the South Coast by offering a more economic outcome for GB consumers than building expensive transmission network infrastructure, whilst also enhancing situational awareness and providing flexibility to the ESO Control Room. This service builds on the valuable collaboration with UKPN via the RDP since 2016.’

- Keith Parker, RDP - MW Dispatch Product Manager, ESO

Better serving battery energy storage systems

We are advocating for a more cost-effective solution to reduce the need for additional Super Grid Transformers in four Grid Supply Points³ (GSPs) by pursuing a non-firm connection for import customers (e.g. customers like commercial battery projects which draw energy from the grid), preventing additional costs to be passed down to customers. After conversations with the ESO and our colleagues across our license areas (LPN, EPN, SPN), our efforts have been focused on progressing the option to defer circa £16m of Super Grid Transformer costs at Ninfield. Energy storage has also been a significant contributor to network capacity constraints due to conservative assessments for storage applications. By treating energy storage projects differently through the work carried out in collaboration at the T-D boundary, we have released ~0.8GW of network capacity, allowing more customers to connect to our network.

Technical Limits

The insights from DERMS and collaborations across industry have resulted in a new approach being put in place by the Strategic Connections Group called [Technical Limits](#), enabling quicker connection at the T-D boundary. Customers are allowed to connect on a non-firm basis ahead of transmission reinforcement. We have established Technical Limits in 12 GSPs in Phase 1 and have currently committed a further 11 GSPs in Phase 2, enabling customers to connect ahead of lengthy reinforcement works on a curtailable basis. Our ongoing work here has allowed us to **accelerate 4GW of connections** in RII0-ED2. This also feeds into our NODD to support our customers in planning their connections as discussed in Section 5.1.

Examples of recent collaboration to better plan our network

We are collaborating with the ESO and NGET on whole system optimisation by resolving GSP constraints as shown by the two below points around battery connections and our coordination at Walpole (near Peterborough) and Sundon (near Milton Keynes):

- At Walpole we are establishing an optimal location for a new GSP (Walpole B) that will provide the highest stakeholder benefit to suit the needs of UK Power Networks, NGED, NGET and the ESO.
- At Sundon we are collaborating with NGET to use non-asset-based solutions, such as flexibility, to address the GSP’s fault-level issues at the lowest possible cost to consumers.

³ A GSP the systems connection point at which the Transmission network connects to the Distribution network.

5.2.2 How we are working across different energy vectors, including heat and transport, to facilitate whole system optimisation

The below examples showcase how we are thinking and collaborating across energy vectors across our operations and further evidence of this engagement is presented in Annex E.

Planning across energy vectors

Our planning for Net Zero fundamentally considers interactions between energy vectors as users look to decarbonise and electrify their energy needs. These interactions are at the core of our [DFES](#) modelling which considers **62 individual key drivers** which we believe are critical in enabling the transition. We model unique sets of demand drivers (core demand, low-carbon transport, battery storage, decarbonised heating, distributed generation, and flexibility) across the **four ESO-aligned future energy scenarios** to represent the speed of decarbonisation and level of societal change in future. Our forecasts for both heat and transport decarbonisation are built from bottom-up consumer choice models which consider the latest government policy and price projections for each scenario. This level of detail helps us to understand the interactions between vectors for each potential future energy pathway.

We are also continuously improving our modelling to better quantify the demand of different energy vectors on our network by updating our long-term forecasting platform – the SFS. This year, through the [Neighbourhood Green](#) innovation project we explored what normal domestic loads and After Diversity Maximum Demand for heating technologies will be in the future, so that networks can be planned, managed and optimised appropriately. We used smart meter data for trial households with heat pumps to update the [heat pump profiles](#) used by our flexibility team and in the SFS for network modelling to better account for the electrification of heat across our network.

Supporting local planning across energy vectors

Our Local Net Zero team has extensive experience working across energy sectors, including with gas utilities. The services we offer to all **133 local authorities within our licence area** are developed to facilitate local planning and to enrich our own forecasts. The [Your Local Net Zero Hub](#), the energy planning tool we are developing to support local area energy planning, features a wide array of data sources including gas network topology from Cadent and Southern Gas Networks. The data can be used by local authorities to make preliminary assessments of hydrogen suitability and to understand which properties do not have access to a gas connection when scoping and planning decarbonisation projects. By engaging directly with local planners, we will further strengthen our modelling of decarbonisation across energy vectors to best serve our customers throughout their decarbonisation journeys.

Supporting customers across vectors

The data we make available on the Open Data Portal also supports stakeholders in their own cross-vector initiatives. For example, the Greater London Authority has used the characteristics of active primary sites to map potential waste heat for heat network planning in London. This allows planners to optimise their use of the network across vectors and support low carbon heating on our network. To support individual consumers in their decarbonisation journeys, our website also showcases specific guidance for our [domestic](#) and [commercial](#) customers on what they need to do if they are considering installing a heat pump or EV charger to support their low carbon choices.

Innovating across energy vectors

Our innovation projects are another important way that we engage across energy vectors to better understand and plan for the future of energy on our network. The innovation team works across six core industry themes which include a focus on whole energy system projects. At the time of writing, our live projects include **18 heat-focused projects, 10 transport projects and three projects which focus on other energy vectors**. Our work across these vectors will help us plan our network, support consumers and work to speed decarbonisation across the UK.

All successfully developed and tested innovation products / solutions are implemented as business-as-usual, bringing us continued value over time. In the last regulatory period, we delivered **over £425m of smart savings** and brought **over 50 projects into business-as-usual**. As one example, this year we closed [Optimise Prime](#), the world's largest trial of commercial EVs which explored the impact of commercial EV charging on our network. This work is enabling us to accurately forecast and plan mitigations, including flexibility and profiled connections, minimising costs for the connected and connecting customer.

The charging profiles developed through this work are now being used in the SFS to enhance our network planning and are helping our curtailable connections team to better plan profiles connections for EV charge points and depots to make the best use of capacity on our network. We have also published the [data from this trial](#) so that other networks, innovators and planners can use these insights in their own decarbonation planning.

5.3. How our enhanced digitalisation and DSO capabilities are informing our future upgrade plans and flexibility procurement

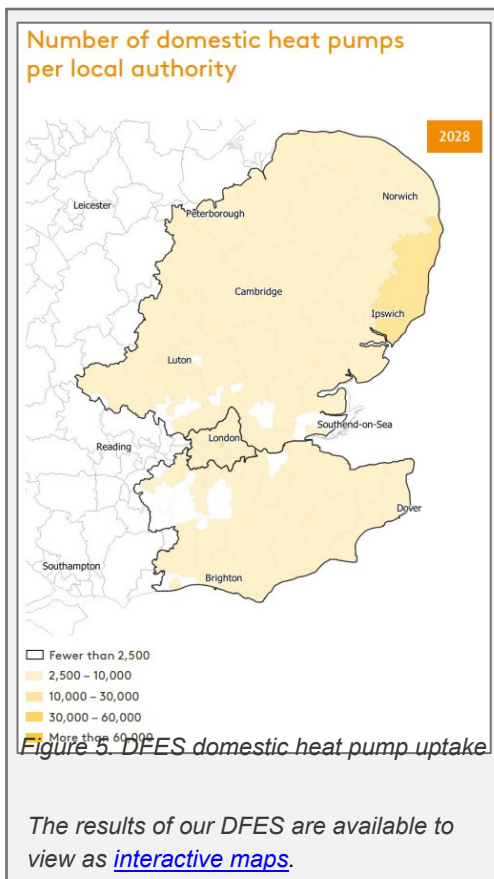
Technology, data, and enhanced digitalisation are the key enablers for a smarter and more reliable network that can provide capacity to our customers at the lowest cost. Our [DSAP](#) outlines our approach, aspirations, and action plan under four main pillars: Customers, Employees, Asset Management and Operations, and Smart Networks. This holistic approach not only enables us to continuously enhance our existing digital capabilities to plan, design and operate our network efficiently but also presents us with a new set of tools and insights to increasingly collaborate with a broader spectrum of stakeholders such as flexibility providers, local authorities, fellow networks and cross-vector organisations.

Smart investment in areas of data, software solutions, and technology infrastructure in RII0-ED1 set a strong foundation for us to incrementally build advanced capabilities in RII0-ED2. We are already pushing the boundaries in the industry by publishing unprecedented levels of data and insights to inform our stakeholders (as detailed in Section 5.1). We are working with key technology partners to develop innovative software solutions that exploit the full set of data available to us both internally and externally to make optimum decisions. We are not only investing in building capabilities in data and technology and but also elevating our competencies in people and processes so we can fully exploit the benefits of digitalisation.

5.3.1 Enhanced DSO capabilities to inform our future upgrade plans and make smart investment decisions

One of the key DSO capabilities is the ability to accurately forecast the network needs. We have developed the SFS to model demand, generation, network constraints, and load-related expenditure forecasts, with insights up to 30 years ahead. These inputs are used for long term investment planning, and feed into key publications such as the Long Term Development Statement (LTDS), Network Development Plan and the Network Scenario Headroom Report. SFS enables us to understand constraints caused by the ever-increasing DER connected to our network and can forecast the number of hours an asset spends over firm capacity. This informs the DNOA process in developing and optimising future upgrade plans with a flexibility first approach.

The SFS is a best-in-class software tool that combines scenario-based LCT modelling, advanced electricity network representations, and network impact assessments, to provide UK Power Networks with a comprehensive understanding of our current and future network. It harnesses high performance cloud computing to model the annual load for each LCT forecast in our DFES. This anticipated load is typically archetype-specific and subject to additional scenario assumptions, such as changes in energy efficiency. We then convert the annual consumption to a distinct diurnal load profile based on the archetype and technology type and stack the profiles for each customer/LCT at each network node to generate an annual peak load forecast for each asset on our network. We are consistently updating this modular tool and adding new profiles and insights from our innovation and planning activities to improve quality of our modelling.



The LCT forecasts which feed into the SFS through the DFES are equally important to this forecasting process and provide a solid foundation for our load modelling. The **DFES’ spatial granularity covers 11,000 Lower Super Output Areas in our region**. Each primary driver is individually modelled utilising advanced bottom-up consumer choice models, incorporating the most recent inputs across policy, pricing, and technological advancements. For example, the **decarbonised heat model considers over 2,000 different building archetypes** and assesses the best option for a package of energy efficiency measures and a low-carbon heating solution, based on cost-effectiveness and the policy environment in each scenario. The module builds on the results of our [Heat Street](#) innovation project, producing the optimal annual uptake rates for the heating technology and energy efficiency packages for each individual archetype.

The granular outputs produced through this process have enabled the DSO to analyse a diverse range of scenarios at the individual asset level as well as the total network. These insights are key to understanding where constraints are likely to arise on our network given the pace of decarbonisation across the region. As discussed in Section 3 and our [DNOA Methodology](#), the SFS load modelling forms the basis of our [Network Development Plan](#) (NDP) where the DSO identifies the system needs – any areas on the network where the forecasted load is greater than the capacity of our assets. After the DSO has identified the needs across our network, it maps out the available options to resolve each system need either through reinforcement or through flexibility in an optioneering process. The DSO team evaluates this full suite of options to deliver the most cost-effective recommendations to our Supervisory Board. Through these initiatives **in the first year of RIIO ED2, we have deferred £130m reinforcement spend and approved £37m network investment**.

Another instance where we are enhancing our DSO capabilities is through increasing network visibility across our low voltage (LV) substations. Through the [Envision](#) innovation project we trialled a machine learning software tool to generate greater LV network insights faster and cheaper compared to traditional physical monitoring methods. This data gives us early sight of potential challenges on the network and enable us to take action, either through deploying one of our toolboxes of smart solutions or investing in targeted network upgrades. The learning from Envision then informed the development of UK Power Networks LV analytics tool which estimates loading on all our LV network, and since 2023 has set the LV baseline for our long-term forecasting tool. The LV data produced through this work is now published on our [Open Data Portal](#) and this enhanced network visibility will help us to best serve our customers into the future. This is one of many [DSO Digital Initiatives](#) we introduced alongside the DSAP which are helping us to deliver on our DSO ambitions.

5.3.2 Leveraging enhanced digitalisation, technology, and data to drive flexibility procurement

Within our ED2 Business Plan we have **committed to deferring £410m of load-related network investment and connecting more than 1.2GW of new generation**, by harnessing the flexibility of customers connected to our network. Our enhanced network modelling supports these ambitions through strengthening our granular network visibility. Our Business Plan also shares our intent to support day-ahead procurement and greater coordination with the ESO to release whole-system benefits and encourage reduced flexibility prices through increased competition.

To deliver these benefits, our DSO has partnered with the power market operator EPEX SPOT to host a flexibility market. Our DSO is using the EPEX Localflex platform to automate the full end-to-end-flexibility procurement process. This builds on the experience we gained by working with platform provider Piclo in RIIO-ED1. This is leading to an improved, more user-friendly and more scalable user experience, with more automation and better integration of processes – from registration, through procurement to settlement. This is a huge step in establishing the UK’s first day-ahead flexibility market at the distribution level. The day ahead tenders allow flexibility providers to offer a more informed view of their availability, presenting new commercial opportunities and enabling better coordination with services to other markets, such as wholesale markets and ancillary services.

Flexibility procured by the DSO is dispatched based on short-term forecasts produced from our operational forecasting software. We use machine learning methods to predict future congestion on the network based on historical load patterns, weather forecasts and other inputs. These forecasts drive decision-making in the control room to dispatch flexible assets such as renewables generators, batteries, electric vehicles, and domestic demand. Using our forecasts, we facilitated the first Demand Turn-Up scheme with Octopus Energy ([Power Ups](#)), releasing more renewable energy on to the network. The short-term forecasts have contributed to optimising the network and reducing outages for the Control room. This was demonstrated during a 12-week outage in King’s Lynn when it allowed generators to export during planned outages as described in section 3.

The DSO has invested in internal development of data and software capabilities, establishing a data science team responsible for data and information provision and development of data-driven tools and solutions – including our short-term forecasting capabilities. The team is responsible for proactive engagement with our customers and stakeholders to create new digital tools to support our flexibility-first way of working. By expanding the data available to our teams, control room engineers and our customers we are supporting the optimisation of flexibility across our network.

5.4. How the activities from our DSO, load related expenditure, and Digitalisation Strategy and Action Plan interact with one another and interface with the SOO

Our DSO Ambition

When UK Power Networks launched the UK’s first independent DSO in 2023, we solidified a flexibility-first approach and set an ambitious target of **reducing reinforcement costs over £410m by 2028**. The ambition of this target mirrors our ambition at the DSO to develop industry-leading flexibility solutions which facilitate efficient use of network assets to support the anticipated uptake of electric vehicles, heat pumps and renewable generation. Unlocking capacity through flexibility is particularly important given the current lengthy queues to connect new generation and storage due largely to transmission constraints. The DSO’s role in delivering timely capacity expansion at lowest cost is central to unlocking the connection of LCTs and renewable generation and accelerating Net Zero across our network.

Load Related Expenditure

We also hope to minimise our load related expenditure (LRE) through this flexibility-first approach. As outlined in our latest [DNOA Methodology](#) and aligned to our above ambitions, the DSO is committed to market testing any system needs before looking towards reinforcement. This increased competition in the marketplace and use of flexibility will ensure that we address issues for the Whole Electricity System, that our network is optimised to meet the needs of the transition to Net Zero, and that we deliver all of this at the lowest possible consumer cost.

Digitalisation Strategy

Our [DSAP](#) provides an overview of our approach to digitalisation, underscoring our view that digitalisation is critical to decarbonisation as it allows infrastructure systems to readily share data and communicate in a common language, maximising efficiency and enabling LCTs / DERs to connect. The widespread adoption of smart chargers and a common protocol to operate these chargers, for example, has the potential to unlock flexibility across energy vectors.

This strategy is also tied to our commitment to offering new services and insights to our stakeholders through the DSO. We will invest to increase visibility of network related information to our stakeholders such as providing network insights for developers to better plan their investment (e.g. [constraint breaches history](#)), planning information for local authorities to accelerate their Net Zero journey (e.g. our [LAEP open data page](#)), and information for the energy market to remove barriers for participation (e.g. [flexibility dispatches](#)). Access to improved forecasting and data provision through these digital initiatives will help us to better develop our flexibility procurement, further optimising our LRE.

Smart optimisation

Smart optimisation – utilising network data to improve decision making – is linked to this commitment to sharing new insights and services with our stakeholders. As discussed in Section 5.1.1 our Open Data Portal and network operational data dashboard are an important part of this work in sharing our insights with stakeholders so that they are able to optimise their own investment and operational decisions. We also pull insights from stakeholders into our own planning via collaboration and engagement events, integrating local energy plans into our DFES and network modelling, and the development of new datasets and new services based on stakeholder feedback/requests.

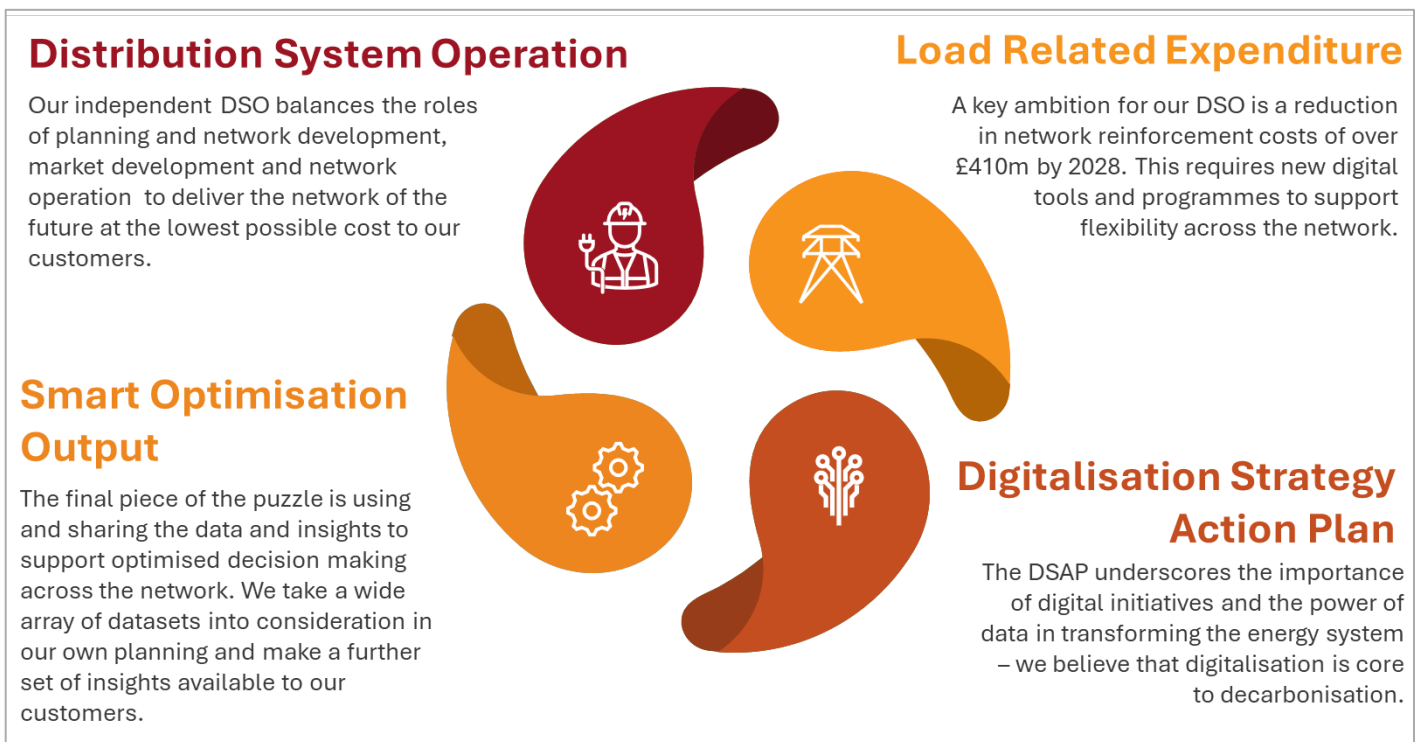


Figure 6. Interactions between the DSO, LRE, DSAP and SOO

5.5. How we are collaborating and partnering with other stakeholders in the co-development of strategic regional projects, plans and net zero strategies

Our Local Net Zero team is a key part of how we interact with our customers. The team has been established to facilitate local Net Zero plans, providing expertise from the electricity sector to complement local knowledge and create credible, ambitious, and actionable decarbonisation plans. By engaging with local communities, governmental entities, industry leaders, and environmental advocates, we foster an inclusive approach to tackling the challenges of decarbonisation. Through transparent communication and shared expertise, we collectively identify opportunities, address obstacles, and innovate sustainable solutions. Across the tools and training we offer, our aim is to enhance and accelerate skills and capabilities in local authority teams to kickstart their initiatives and advance their energy planning.

'I've been impressed by the Local Net Zero team taking the time to understand my needs, and then providing bespoke support to help me prepare to take advantage of the flexibility opportunities in my area.'

- Jeremy Martin, Head of Energy and Carbon Management in Hackney Borough Council

UK Power Networks' Local Net Zero initiatives include a dedicated [LAEP open data page](#) (distinct from our general [Open Data Portal](#)) and the [Your Local Net Zero Hub](#) tool, benefiting millions of people in our region. As recognition of our continued collaboration, our team has won the [International Energy Engagement Award](#) for our cooperative efforts with local authorities, providing expert advice, data, and digital tools to support decarbonisation plans.

5.5.1 Supporting local and regional stakeholder projects, plans, and Net Zero strategies

LAEP Framework

Our stakeholder-endorsed [LAEP framework](#) provides a three-tiered collaborative support service, reviewing regional or local climate change action plans and using them to inform our network capacity planning. This ensures UK Power Networks can support decarbonisation plans whilst investing with confidence. This builds on our engagement with Local Authorities since 2021, where we collaborated with six County Councils to co-develop a three-tiered LAEP framework to support their regional and local climate change ambitions.

The LAEP framework is designed to balance a number of factors. It takes into account the need for assurance (as any adjustments in forecast materially drives investment activities), and the need to support community-based plans and targets. The framework ensures that we can be confident that a plan is well-evidenced and rigorous before it is used to adjust our annually updated DFES which shapes our local level demand, generation and storage forecasts over time to inform our network capacity planning process. This innovative framework was a key ambition as part of our RII0-ED2 Business Plan 2023-28. In 2021, thirteen regional planning authorities endorsed the process with letters of support. This accounts for **93% of our customer base within our licence areas**. We continue to validate and gather feedback on the framework from Local Authorities and local stakeholders. During our 2022 Regional Engagement Sessions **across our thirteen regional planning authorities, we tested our Tier 1 Assessment considerations, and they received 79% endorsement**.

The below figure shows the interaction between local climate change action plans and our LAEP framework.

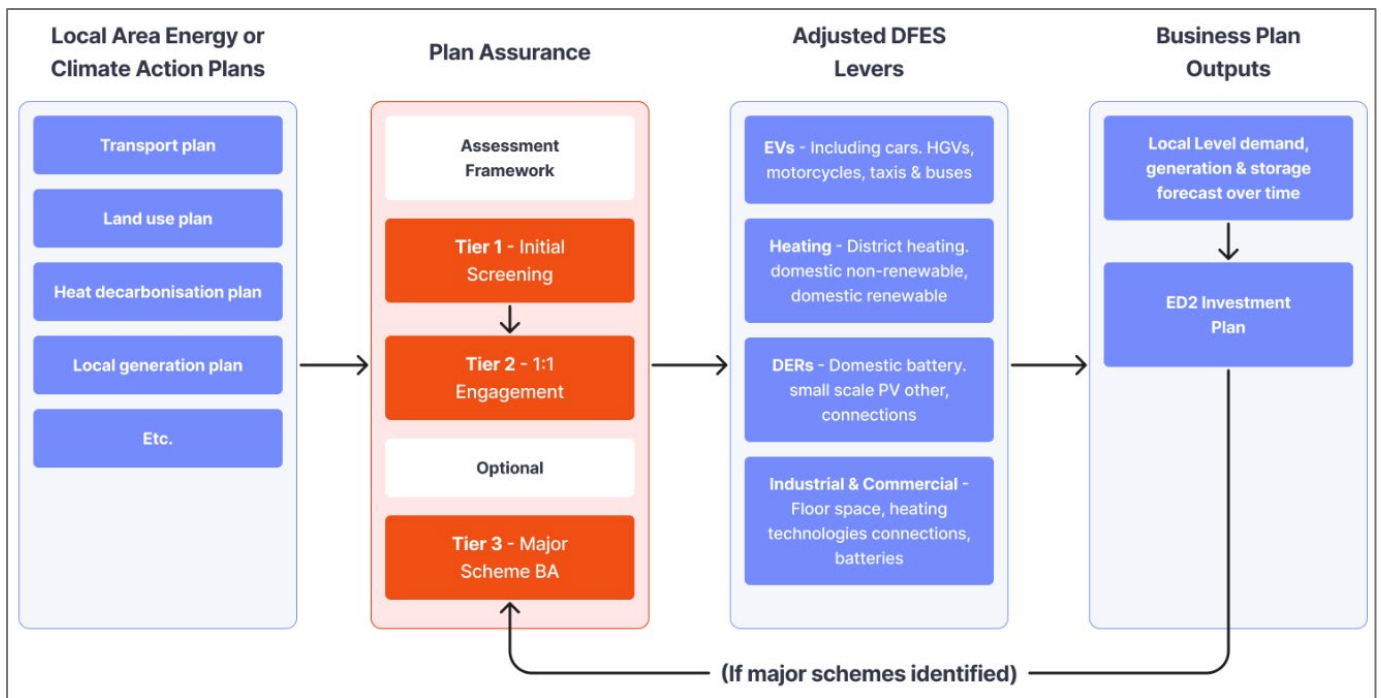


Figure 7. Our LAEP framework

Through the LAEP framework we collaborate and partner to support stakeholders in the following tiered system:

Tier	Description	Support
Tier 1 – Annual Review	Conduct annual reviews of local area energy or climate change action plans. Engage with Local Authorities to identify collaboration opportunities.	Provide guidance and support to align plans with network needs.
Tier 2 – In-depth Engagement	Perform materiality assessments to understand the impact of plans on the network. Assess confidence in plans to determine regulatory approval and investment inclusion.	Collaborate with Local Authorities to enhance confidence and secure regulatory approval.
Tier 3 – Major Scheme CBA (Optional)	Conduct cost-benefit analysis for projects requiring large-scale investments.	Work with Local Authorities to remove barriers to infrastructure investments. Undertake engineering assessments and detailed analyses as necessary.

Examples of Collaboration

A primary example of collaboration to support stakeholders can be seen through the Greater South-East Net Zero Hub (GSENZH). The [GSENZH's Net Zero Tools site](#) provides resources and support for public sector organisations aiming to develop

Net Zero projects, offering tools, guidance, and datasets to facilitate the transition to Net Zero. As part of this collaboration, we are coordinating with the GSENGH to promote services supporting local authorities.

Peterborough City Council have shared their local area energy plan with us. Together, comparing their forecasts with our own, we discovered that uptake of solar PV was a key difference. Following this analysis, we had a series of discussions where Peterborough ultimately decided they wanted us to wait until they had an associated delivery plan before using this information to inform our forecasts that shape our network investment strategy. We will be continuing our close collaborations with them as their plans progress.

'It's been really useful working closely with UK Power Networks to build a shared understanding of the local energy landscape and future plans. UK Power Networks have been supportive throughout this process, with a real openness to collaboration. I look forward to continuing our work together as the council focuses on translating Peterborough's Local Area Energy Plan into reality by creating feasible delivery plans.'

- Hannah Swinburne, Climate Change Manager, Peterborough City Council

Another example is the collaboration [initiative with UK100](#), a cross-party membership organisation that supports ambitious councils in achieving their Net Zero and Clean Air targets. It fosters collaboration, knowledge-sharing, and partnership-building among members to accelerate action on climate change to support local leaders in their decarbonisation efforts. For example, UK100's Chief Executive featured as keynote speaker in the kick off webinar of our Regional Engagement Sessions in October 2023 as well as our [Local Net Zero Webinar in March 2024](#).

5.5.2 How stakeholders can access people and information within UK Power Networks to support collaborative local and regional projects

LAEP Open Data Page

UK Power Networks provides a dedicated [LAEP open data page](#), which transparently shares a huge amount of LAEP-specific data in accessible formats to provide a platform for access to people and information within UK Power Networks to support collaborative projects specially to support local Net Zero planning.⁴ To help local authorities and their collaborators understand how to access and use the data on the page we organised a [webinar](#) dedicated to the role of open data in enabling net zero planning.⁵ Stakeholders can access data related to the operation of the electricity network and even explore case studies showcasing how local authorities and LAEP practitioners are utilising data for their energy planning efforts. This page, within the wider UK Power Networks Open Data Portal, aims to make it easier for local authorities and energy planning practitioners to access relevant data to support their Net Zero planning efforts.

LAEP Open Data Page Resources

We offer specific resources for stakeholders to utilise our open data and create LAEPs, consolidating essential sources into one accessible platform. The resources aim to support local authorities in navigating the complexities of energy planning and facilitating the transition to a Net Zero future. Key sections of the LAEP data / support offering include:

- *Useful datasets:* all our data relating to the operation of our electricity network in one place including information on new revenue streams and support the transition to Net Zero by participating in our flexibility tenders.
- *Case Studies:* overview of how Local Authorities & LAEP Practitioners are using our data.
- *Guidance:* helpful resources on using the LAEP Open Data page.
- *Your Local Net Zero Hub:* additional resources and our energy planning tool designed for local authorities.
- *Use Cases by Theme:* use cases for different Net Zero themes, such as electricity generation, land use and environment, heat and buildings, social benefit and just transition, transport and mobility, and economic benefits.
- *Feedback:* avenue to provide feedback; we are interested in identifying any other data which should be included.

Your Local Net Zero Hub

The [Your Local Net Zero Hub](#), launched in April 2023, makes it easier for local authorities to develop and share their latest decarbonisation plans (e.g., deployment of EV charging points) with us as early as possible and build understanding of the

⁴ Annex F provides an overview of some of the data showcased on the LAEP Open Data Page.

⁵ Annex G showcases the details of this webinar alongside further engagement examples from our Local Net Zero team.

certainty of decarbonisation plans to enhance our forecast with local intelligence. By **providing access to 170 new datasets via the LAEP Open Data page**, including **52 specifically tailored for the Your Local Net Zero Hub platform**, we address the common challenges faced by local authorities in decarbonisation efforts. These challenges include limited resources, expertise, and data access. The platform facilitates the development of credible and investable energy plans, incorporating factors like market trends, transport electrification, and social inclusion policies, alongside geospatial network infrastructure data. Through **extensive engagement with 133 local authorities**, we have identified and addressed key obstacles to achieving Net Zero. Currently, **98 local authorities are onboarded, with 87 actively using the platform to build LAEPs**.⁶ Our collaborative approach, reinforced by user acceptance testing and training resources, ensures maximum value for local authorities in their transition to Net Zero.

Our Your Local Net Zero Hub serves as a centralised platform connecting stakeholders with resources and support necessary to achieve net zero goals. Stakeholders can leverage the Your Local Net Zero Hub for:

- **Support, Collaboration, and Facilitation:** The Local Net Zero Team at UK Power Networks offers support, collaboration opportunities, and facilitation of best value solutions to aid local climate plans. This includes [fortnightly drop-in sessions](#) for the Your Local Net Zero Hub on topics prioritised by local authorities. This training is further complemented by 1-2-1 training⁷ with the Local Net Zero team and a suite of self-service guides and videos.
- **Sharing Net Zero Plans:** Utilise features like the DFES Scenario Selector, DFES widget, Your Decarbonisation Story via the Your Local Net Zero Hub and Data Dictionary through 1-2-1 engagement with the Local Net Zero team to set Net Zero estimates, share forecasts and information on projects, guiding UK Power Networks' investment plans and ensuring effective infrastructure investments to support electrification.
- **Resources:** access a comprehensive range of resources related to LAEP, including tools, frameworks, case studies, and third-party resources.

The below image outlines the key features available within the energy planning tool.

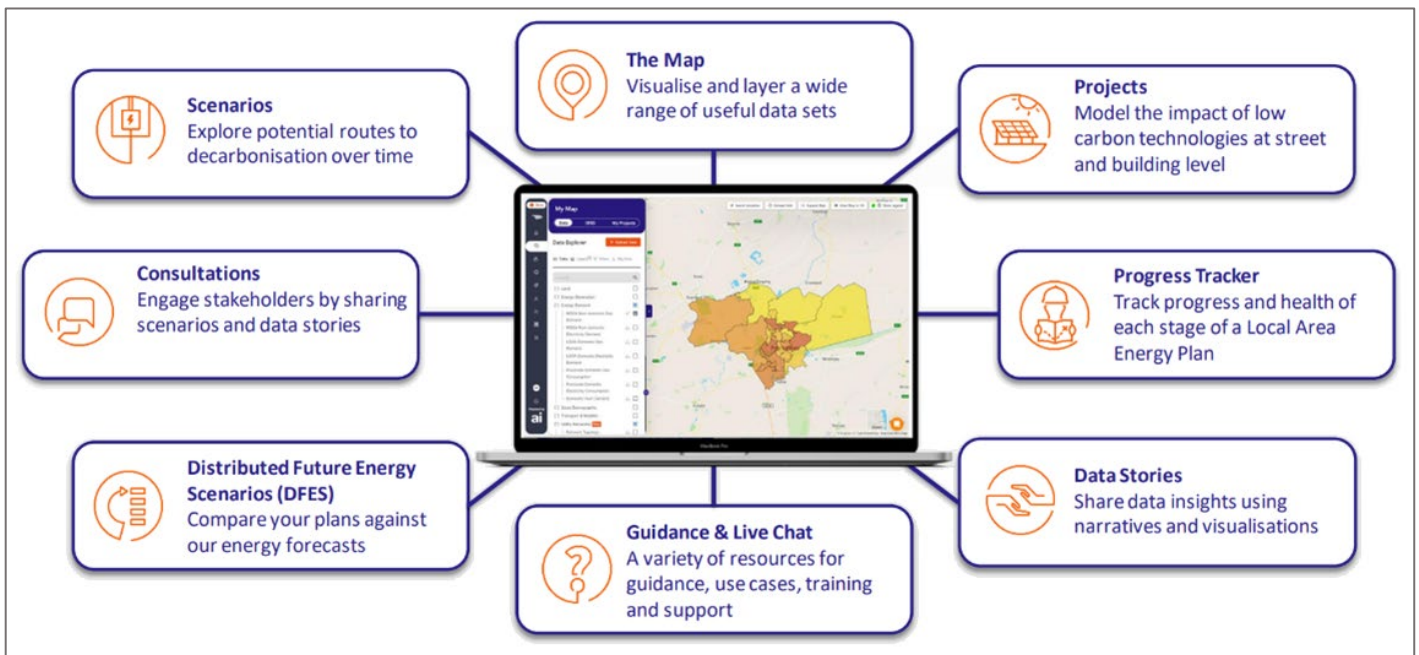


Figure 8. Features available in the energy planning tool

⁶ Annex H shows the number of organisations registered to use the tool overtime.

⁷ Annex I provides a log of sessions completed to date.

Distribution Future Energy Scenarios (DFES)

[DFES](#) forecasted technology uptake to 2050, aligning with established energy scenario worlds outlined by the Energy System Operator (ESO). Stakeholders can access interactive summaries, technical reports, and raw data files to inform climate action plans. Key features of DFES include:

- Scenario Worlds: Our DFES models different drivers of change to create scenario worlds illustrating potential energy futures. Stakeholders can explore these scenarios to inform local planning efforts.
- Stakeholder Engagement: UK Power Networks undertakes stakeholder engagement and welcomes feedback on DFES projections via email, fostering collaboration and dialogue to improve planning outcomes.

5.6. How we are highlighting and reflecting changes in the wider data assets, digital tools, and strategic planning decisions that are feeding into the SOO

At UK Power Networks, data publication is influenced in three tranches – retrospective, reactive, and proactive. The sections below provide an overview of how these three tranches are used across the datasets and tools that we use and share. More information on our approach to open data can be found in our [Open Data Principles](#).

Retrospective

Retrospective data sharing involves consolidating existing datasets that UK Power Networks already publish, such as the [Long Term Development Statement](#) and the [Embedded Capacity Register](#), so that our data users only need to go to our Open Data Portal to access this data, under clear and standardised open data licensing.

Reactive

Reactive data provision is often provided off the back of stakeholder engagement through events like our [connections customer forum](#) or the work that we do with local authorities (see Section 5.5 for further details). The Open Data Portal additionally has a data request form so that stakeholders can request datasets from us. From the launch of our Portal in October 2021 to date, we have **received 266 data requests**. Where the data is not already published, these trigger a data triage process, where the respective data owner within UK Power Networks considers whether a dataset can be published, consulting relevant risk specialists when required. As emphasised elsewhere, our ability to share data with stakeholders is a key part of our ambition to deliver excellent service for our customers and to facilitate Net Zero through an efficient electricity network. Our decisions to release new datasets and tools, like GSP-level connections data through the NODD, are often tied to direct requests from stakeholders.

Stakeholders also have a direct say in our data and information provision activities through our broader engagement initiatives. For example, our 132kV circuits operational data was informed through extensive engagement with potential users, such as renewable energy developers looking to run bespoke network studies to understand connection offers. These data users require granular datasets on historical network usage to model how the network will develop, affecting network access, curtailment levels and thus potential revenues. These studies are reported to investors who ultimately decide the fate of the project – as a result, these datasets are vital to accelerating the development of new energy assets. Through consultation with developers, we iterated on how the data would be published, and developed a method for releasing key statistics on parts of the network where some data could not be released due to its commercial sensitivity. We remain in close contact with users and responsive to feedback on how it could be enhanced and improved going forward. In 2024/25 we will expand this dataset to our 33kV network.

Through engagement with generation operators, we have developed a curtailment data / tool offering which is industry leading. We were the first DSO to publish full [curtailment data](#) to support our customers in reducing curtailment across the network. Off the back of this initial release, we consulted with battery optimisers to understand how curtailment affects their operations and trading strategies, and designed world-first curtailment forecasting software to provide a two-day ahead probabilistic estimate of curtailment. This enables storage assets to operate more efficiently, offering crucial balancing services to the grid. We held a [webinar](#) in early 2024 to discuss how developers can harness and access this new tool. The below graphic showcases a few examples of how we respond to flexibility data requests.

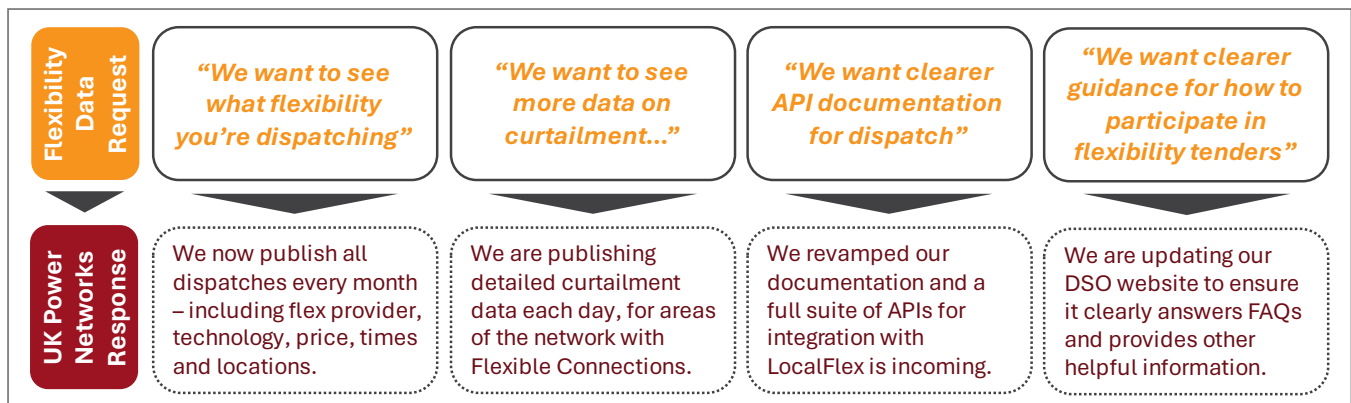


Figure 9. Responding to flexibility data requests

Proactive

Proactive data sharing involves longer term thinking, anticipating what data our users might want in the future. An example of this is the yearlong engagement with local authorities that culminated in the dedicated local area energy plan page, the [LAEP Open Data Page](#). The page is consistently being revised with increasing amount of data to suit the needs of our stakeholders.

As of the publication of this document, the [LAEP page contains 170 datasets](#) (139 sourced by third parties and 31 sourced from UK Power Networks), with [95% of them available to councils](#) (i.e. either openly available, available via registration/subscription, or held by councils internally). Additionally, to support ease of access and analysis, 53 datasets are accessible by API.

5.7. How we are participating in the development of LAEPs, Net Zero roadmaps and other strategies and cross-utility solutions, led by local and regional authorities and supported by the communities we serve

As detailed in Section 5.5, UK Power Networks is actively participating in the development of LAEPs, Net Zero roadmaps, and other strategies led by local and regional authorities. While the detail in previous sections cover an overview of the work we do, this section provides some additional concrete examples of this support.

5.7.1 Engagement to support local and regional authorities

UK Power Networks actively engages with stakeholders through various channels, including webinars, beta training sessions, and regional engagements. These engagements provide opportunities for local authorities and partners to share insights, collaborate on projects, and access tailored support. Recent examples of engagement are included in Figure 10 and explained further in Annex G:

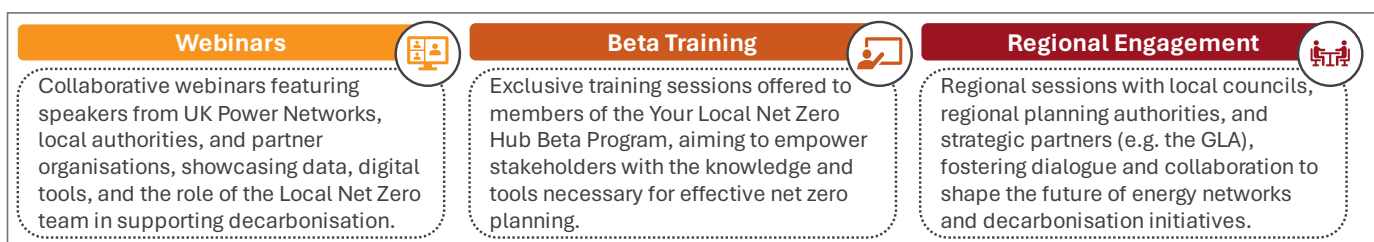


Figure 10. Engagement to support local and regional authorities

Additionally, as part of the Energy Networks Association (ENA), together with our electricity and gas network peers, UK Power Networks led the group coordinating the collaboration between across utilities to support Local Authorities with their decarbonisation plans developed new regional planning guide, '[Collaborating for local net zero planning and delivery](#)'. Local authorities, ranging from county to combined authorities, are already driving the rollout LCTs through their local energy planning and investment efforts. We acknowledge their instrumental role in facilitating local decarbonisation plans and emphasise the importance of efficient planning for the future energy system. By working with local authorities, we can more

accurately forecast investment needs for energy infrastructure to support the local deployment of LCTs, ultimately contributing to the achievement of Net Zero objectives.

5.7.2 Supporting other organisations through our Open Data Platform

A data reuse is where the data published on our Open Data Portal, is used by another person or company. This can take various forms such as referential data in another system, a geographic view on a smart phone, or to form part of academic research. The main principle of open data is that it can be used freely, reused and re-distributed by anyone. Whilst this means we do not always know how our data is being used or see the direct benefits of publishing the data, we can be confident that we are supporting organisations within the communities we serve. A few examples are outlined below in Figure 11, with full list of shared [UK Power Networks' Open Data Reuses](#) on our website.

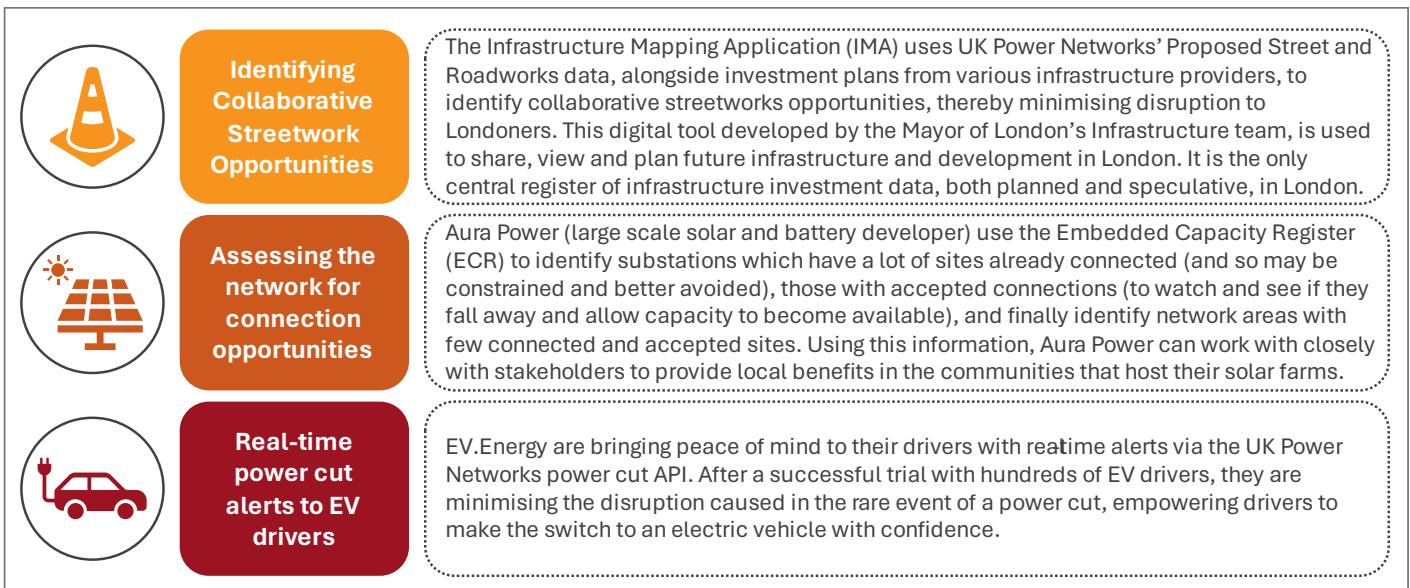


Figure 11. Data reuses

6. Conclusion

This Collaboration Plan sets out the key steps we are taking towards embracing a whole-system approach to navigating the evolving energy landscape. By fostering collaboration and partnership with our energy customers, fellow network operators and cross energy vector stakeholders, we have laid the foundation to tackle the complex challenges of our interconnected energy ecosystem. This collaborative effort will enable us to optimise the balancing act inherent in the energy trilemma, ensuring that we meet the growing demand for reliable and affordable energy while simultaneously reducing carbon emissions and promoting sustainability. Through proactive engagement and innovative thinking, we can achieve a more integrated and resilient energy system that serves the needs of both current and future generations.

Leveraging the power of data, technology and digitalisation, we are incrementally enhancing our capabilities to make informed and optimum decisions for investment and network planning; enhance operational efficiency; and drive innovation across the whole energy ecosystem. We are committed in engaging with our stakeholders to share our knowledge and insights as well as to gather industry knowledge and requirements to better inform our decisions. The SVI platform as part of our Open Data portal will continue to host useful datasets for our stakeholders.

ANNEXES

7. Annexes

The annexes presented showcase a breadth of supporting information. Annexes A, B, D, and F provide additional detail regarding aspects of UK Power Networks' ongoing work which contributes to smart optimisation (e.g. details regarding our System Visualisation Interface, our latest strategy documents, and examples of data provision) while Annexes C, E, G, H, and I demonstrate how we have engaged with stakeholders (e.g. engagement logs) in the development of the SOO and show how, on an ongoing basis, we are using stakeholder feedback to improve our Collaboration Plan and System Visualisation Interface to maximise value for our stakeholders.

7.1. Annex A – System Visualisation Interface Requirements

Item	Requirement	Status	Description
3.1.1.	<i>Provide a representation of the licensee's existing network assets and known associated constraints using both static and dynamic data. Such data should include the type, capacity, and location of assets and the location and specific nature of known constraints, on all parts of the distribution network, at all voltage levels. Heat maps and raw data must be made available through an Application Programming Interface (API) that is common across all licensees.</i>	✓	The Network Infrastructure and Usage (NIU) Map is a layered heat pump with a number of layers including Demand Headroom, DNOA – Signposting, DNOA – Flexibility, Infrastructure Upgrades, GSPs, Grid Sites, Primary Sites, Secondary Sites, 132kV Overhead Lines, 132kV Poles and Towers, 66kV Overhead Lines, 33kV Overhead Lines, 33kV Poles and Towers, HV Overhead Lines, HV Poles, LV Overhead Lines, LV Poles, Curtailable Connections, Fossil Fuel Sites, Wind Sites, Biogas Sites, Storage Sites, PV Sites, and Low Carbon Technology Register. Data across the layers provides type, capacity, and location of assets and the location/season of known constraints on all parts of the network at all voltage levels. All data is available through an API.
3.1.2.	<i>Provide a representation of the licensee's network in the future, including expected constraints. Such data is to be presented in a format and time horizon to be determined collectively by licensees and their stakeholders and made available through an Application Programming Interface (API) that is common across all licensees.</i>	✓	Our Distribution Network Options Assessment (DNOA) layers indicate where and when we are forecasting network constraints. This acts as a signal for the flexibility market, as an invitation to provide flexibility services to UK Power Networks. In the event we do not secure enough flexibility, we may reinforce – with or without flexibility. We also publish our Long Term Development Statement Infrastructure Upgrades – which shows reinforcement works and when we expect them to take place. All available via API.
3.1.3.	<i>Highlight where operational and growth challenges on the licensee's network might emerge, including future constraints, and where opportunities for flexibility services will arise, as a means of avoiding or deferring the reinforcement or replacement of assets.</i>	✓	See above.
3.1.4.	<i>Incorporate data sets, digital tools, strategies and reports that exist under their respective DSO, LRE and Data & Digitalisation strategies, including but not limited to: LTDS, heat maps, NDPs, DFES, network impact assessments, data visualisation and digital tools, strategic network planning outputs, Primary and secondary reinforcement data incl. the Load Index submission, LRE strategies and plans, DSO strategies and Digitalisation Strategies and Action Plans, flexibility strategies and procurement plans</i>	✓	As per 3.1.1., our SVI incorporates these elements. DSO Strategy and Digitalisation Strategy are linked in the Portal's top banner under "UK Power Networks". Our flexibility procurement plans are reflected in the "DNOA – Flexibility" layer of our SVI and further information can be found on our DSO Flexibility Tender Hub .
3.2.	<i>Licensees must work with their stakeholders to develop a System Visualisation Interface that meets the principles of transparency, accessibility and interoperability.</i>	✓	As with our whole Open Data Portal, we are consistently working with stakeholders to develop an SVI that meets the principles of transparency, accessibility and interoperability. For example, as part of the Beta testing for this tool, comments and issues were logged, solutions proposed and tracked until completion. Additionally within our User Guide and Additional

			<p>Information page, stakeholders are able to review any how to videos, review map layers and our Data Roadmap, submit a data request, submit feedback, submit reuse cases on relevant datasets, and as always email us for anything further.</p>
3.3.	<p><i>The SOO does not require the development of a digital map or platform. The System Visualisation Interface must be a section of the licensee’s website and open data portal that provides access to this package of forward-looking, open and accessible, digital network tools and related information.</i></p>	✓	<p>The SVI is available here: Network Infrastructure and Usage Map (NIUM) — UK Power Networks (opendatasoft.com). It consists of forward-looking, open and accessible, digital network tools and related information. Alongside this specific section of the website, the overall Open Data Portal provides full visibility of our open data tables, functionality to create API keys, and bespoke development of charts and maps.</p>
3.4.	<p><i>Interoperability between the different licensees’ System Visualisation Interfaces, is critical to enable users to efficiently interface with these tools and related information. In meeting their obligations in respect of the SOO we expect interoperability to be achieved through data best practice (DBP). The licensees’ compliance with DBP will standardise the format of any common data assets shared and make the same data assets easily shareable and accessible across all licensees. We also expect network assets to be described using the CIM data standard, as developed through the LTDS working group.</i></p>	✓	<p>Embracing Ofgem’s Data Best Practice principles, we ensure easy access to information, fostering understanding and enabling customer influence on plans through platforms like our DSO website and annual Forward Plan. By sharing extensive DSO data via our SVI and Open Data Portal and championing best practices internationally, we actively support the adoption of open data platforms and foster collaborative learning within the energy sector.</p> <p>An important part of making this data as useful as possible is the standardisation of a Common Information Model (CIM). Cross-industry efforts to develop a CIM help build a platform for enhanced collaboration, facilitating seamless access and integration of data from across the energy system. This integration enables stakeholders to effectively extract and utilise data for informing comprehensive cross-vector and whole-system plans. We have been inviting beta testing to our CIM Proof of Concept.</p>
3.5.	<p><i>If, in the process of collaborating with local stakeholders, licensees decide that there is the need for additional digital products or services, these products or services should be incorporated into the SOO.</i></p>	✓	<p>Aligned to section 7., UK Power Networks regularly collaborates with stakeholders regarding general data requests, the System Visualisation Interface, and generally the Open Data Portal. For each of these, we log and review issues/feedback/requests, perform triage assessments, and proceed to solutioning and data publication where applicable.</p>
3.6.	<p><i>The System Visualisation Interface should be accessible to stakeholders no later than 1 October 2023 and for the remainder of the Price Control Period. It is expected that the content that can be accessed through the System Visualisation Interface will develop over the course of the Price Control Period, however, as a minimum, the digital tools described at 3.1.1 and 3.1.2 must be accessible by 1 May 2024.</i></p>	✓	<p>The SVI is already made publicly available (linked in the below cell of this table), and it will remain available and will develop over the course of the Price Control Period.</p>
3.7.	<p><i>The licensee must ensure that the System Visualisation Interface is available on its Website.</i></p>	✓	<p>Available here: Network Infrastructure and Usage Map (NIUM) — UK Power Networks (opendatasoft.com)</p>
3.8.	<p><i>The licensee must update information within its System Visualisation Interface as soon as reasonably practicable and make clear to users the polling frequency for specific data sets and the time and date of the most recent update.</i></p>	✓	<p>Within our User Guide and Additional Information page, under the Map Layer Dataset Details, and overview of each map layer, dataset name, additional information, last update date and dataset link is provided.</p>

7.2. Annex B – Key strategies and documents

Key documents, strategies and platforms referenced throughout our Collaboration Plan.

Platform / Publication	Web link
Open Data Portal	Open Data UK Power Networks
Data best practice guide	Data Best Practice Guidance v1.pdf (ofgem.gov.uk)
DSO website	UKPN Distribution System Operator (DSO) - UKPN DSO (ukpowernetworks.co.uk)
DSO Forward Plan	1010893-UKPN-DSO-Report-1.pdf (d11f1oz5vvd9r.cloudfront.net)
Network Operational Data Dashboard	Network Operational Data Dashboard — UK Power Networks (opendatasoft.com)
System Visualisation Interface	Network Infrastructure and Usage Map (NIUM) — UK Power Networks (opendatasoft.com)
DNOA	Distribution Network Options Assessment (DNOA) (ukpowernetworks.co.uk)
DFES	Distribution Future Energy Scenarios - UKPN DSO (ukpowernetworks.co.uk)
Whole Systems Register	Whole System Register (ukpowernetworks.co.uk)
Your Local Net Zero Hub	Your Local Net Zero Hub
LAEP Open Data Page	Local Area Energy Plan — UK Power Networks (opendatasoft.com)

7.3. Annex C – Other engagement logs examples

UK Power Networks keeps logs of multiple sources of engagement. The table below outlines some further examples of the types of engagement logs held and actively reviewed.

Category	Description	Resulting action(s)	Items logged	Time period over which items logged
Data Requests	Log of data requests / desires based on user feedback (e.g. <i>network asset data in shapefile GIS format</i>)	Respond to data requests, leading to data triage assessments, and data publication where applicable.	266	Oct 2021 – Mar 2024
System Visualisation Interface	Beta user test log to our Network Infrastructure and Usage Map (e.g. <i>flag that zooming is required to see poles</i>)	Comments and issues logged, solutions proposed and tracked until completion.	20	17 Feb 2023 – 22 Feb 2023
Open Data Portal	Log of feedback on our Open Data Portal itself (e.g. <i>option of having a dark mode view</i>)	Log, review, and pass on list of desires for ongoing conversations with our service provider – Opendatasoft	27	Jan 2023 - Jan 2024
Whole Systems Register	Log of individual instances where UK Power Networks has consulted or collaborated with stakeholders, including local authorities, other energy networks, and large energy users	Solutions arising from working and coordinating collaboratively across the whole value chain (networks, LAs, consumers, retailers, technology firms, etc.) to deliver societal benefits and low cost, secure electricity to customers.	<i>Count of engagements in the 2024 publication is expected to rise to ~70 (up from 47 in 2023)</i>	<i>As noted in the cell to the left</i>

7.4. Annex D – UK Power Networks Open Data Portal dataset examples

A few examples of the types of data stakeholders can access and utilise are noted below; a full list of datasets is available on the portal's [data catalogue](#).

- **[Network Infrastructure](#)**: data describing the electricity network including the location and characteristics of equipment. Examples include:
 - [Key characteristics of active Grid and Primary sites](#) - list of active Grid and Primary Sites with key characteristics including spatial coordinates, year commissioned and asset counts against the site.
 - [Long Term Development Statement \(LTDS\) Infrastructure Projects](#) - provides details of current network and from 132kV to lower voltage of a primary substation, and plans for the development of UK Power Networks' three licence areas over the next five years. The LTDS is updated twice a year: end of May; and end of November.
 - [UK Power Networks Licence Area LV Poles](#) - shows the location of UK Power Networks' LV (Low Voltage) poles.
- **[Network Usage](#)**: data related to the historic, current and future operation, performance and usage of the electricity network. Examples include:
 - [Distributed Future Energy Scenarios Network Scenario Headroom Report \(DFES NSHR\)](#) - indicates the amount of unused network capacity for demand and generation over time to 2050 on our Bulk Supply Point (Grid) and Primary substations. It shows where we may need to further reinforce our substations or procure flexibility services beyond our existing plans, if the energy system develops as indicated in each of our scenarios.
 - [Low Carbon Technologies \(LCT\) Register](#) - volume of demand and generation LCTs connected or accepted to connect to UK Power Networks' Secondary Substations.
 - Embedded Capacity Register (ECR) lists all generation, storage and flexible demand resources – there are two files separated based on whether the installed generation capacity or export is [50kW to 1MW](#), or from [1MW upwards](#).
- Additional examples of *connections data*:
 - [Low Carbon Technologies \(LCT\) connected to the UKPN network](#) - volume of LCT for both generation and demand (under 1MW) connected to UK Power Networks by Primary Substation. Includes primary site spatial coordinates and covers LCT types: EV Charging Point; Heat Pump; Hydro; Combined Heat and Power; Solar, Wind; and Battery Storage among others.
 - [Long Term Development Statement \(LTDS\) Table 6 New connection interest](#) - LTDS report on a 0-5 year period, describing a forecast of load on the network and envisioned network developments; Table 6 indicates the level of new connections interest at each Primary substation. Published 30 November 2023.
 - [Open Street and Roadworks connected to UK Power Networks' activities](#) - details of open street and roadworks permits and private activities taking place on the highway or on private land within the UK Power Networks footprint. See what work we are doing, where and when you can expect us to finish. This report is refreshed every two hours.
- Additional examples of *curtailment data*:
 - [Constraint Breaches History](#) - records all curtailment events experienced by curtailable-connection customers. Details regarding curtailment, the methodological approach, quality control, and assurance are provided as well.
 - [Standard profiles UK Power Networks uses for electricity generation](#) - typical load profiles that UK Power Networks uses for different generation technologies. This dataset aids curtailment studies, and this dataset is an Incentive for Connections Engagement (ICE) commitment.
 - [EHV Network Outages](#) - frequency and duration that EHV electricity assets are out of service for planned outages from UK Power Networks' Network Vision - an outage planning tracking tool. Which provides a customer facing web portal to provide information about generation customer curtailments and shutdowns to our customers and provides an interface for our customers to engage with our Outage Planners.

7.5. Annex E – Examples of cross vector engagement and collaboration

Log of 29 engagement activities by cross-vector category (Transport, Heat, Gas and Other).

Category	Context or Project Name	Description of the engagement	Stakeholder	Engagement Time period
Transport	Load Forecast, London Bus electrification	Collaboration and information exchange between UK Power Networks and Transport for London discussing strategic planning for London bus electrification, electrification of heat in TFL depots, timed connection and profile connections on constrained parts of London.	Transport for London	April 2024
Water	Resilience	resilience of supplies, review of faults	Thames Water	March & April 2024
Water	Development areas	resilience of supplies, review of faults	South East Water	June 2023
Transport, Heat	Emerge	The Emerge Project aims to enhance customer satisfaction for domestic supply upgrades (fuses) in response to distress or emergency upgrade events by partnering with third party meter operator organisations to streamline the customer journey, remove bottlenecks, and accelerate the timeframes in which customers could switch to low carbon heating.	Octopus	February 2022 - August 2023
Heat	Neighbourhood Green	Neighbourhood Green developed an understanding of normal domestic loads and After Diversity Maximum Demand (ADMD) when taking into account heat pumps and other LCTs	None	February 2022 - February 2024
Transport	Powercast	The Powercast project developed an API that shares power cut data to EV charging platforms and charge point operators so that they could inform their customers of powercuts affecting their homes and to provide tailored advice on alternative locations to charge their vehicles	ev.energy, 100x customers	November 2022- February 2024
Other	CommsConnect	CommsConnect aims to address the increased interdependency between electricity networks and cellular networks as communications for control of assets on networks more towards the public mobile networks. The project aims to set up a data sharing solution whereby electricity network operators and mobile network operators can share data on the interdependence of their assets and make decisions on where best to make investments in network resilience.	Mobile Network Operators (Vodafone, EE), JRC, Ofcom, DSIT, Anglian Water, Scottish Water, SGN	April 2023-July 2023, October 2023-March 2024
Other	Connectrolyser	Minimise impact of hydrogen electrolyser hubs on our network by exploiting flexible operation	National Gas Transmission	April 2023-July 2023, October 2023-March 2024
Gas, Other	CRedo+ Climate Resilience Demonstrator	CRedo+ is a Climate Resilience Demonstrator digital twin that is now moving from demonstrator to a full-fledged product called Climate Resilience Decision Optimisation. The digital twin provides asset owners with long term resilience planning and regulatory reporting capability that is in response to the growing risk on assets from climate change and extreme weather scenarios. Its innovative approach enables identification of the cascade impact of interconnected assets across sector by combining data from cross sector utility organisations. This enables climate risk modelling and decision support whilst identifying optimum investment opportunities.	Network asset owners in electricity, gas, water and telecoms	April 2023-July 2023, October 2023-March 2024
Heat	Full Circle	Recover waste heat from primary substations to improve efficiency of heat networks	SGN Commercial Services, Wandsworth Borough Council, housing developers, Atelier 10, Barnet Council	April 2023-July 2023, October 2023-March 2024
Heat	Heatropolis	Optimise the electrical load profile for heat networks through thermal storage and flexibility	Local authorities (Camden Council, Royal Borough of Greenwich), NG ESO, Heat Network Operators (Metropolitan), Private/Estate Management companies (Argent), Independent organisations (Heat Trust), Gov/Policy (DESNZ), Smart heating control specialists (Passiv UK)	April 2023-July 2023, October 2023-March 2024
Heat	Heat Risers	Accelerate decarbonisation of heat in multi occupancy buildings reducing costs for all	Local authorities (Lewisham, Waltham Forest, Portsmouth City Council, Somerset Council, London Borough of Hounslow, Royal Borough of Chelsea and Kensington), Housing Associations (Peabody & Haig Housing) Heat Network Operators (Vatenfall), Private/Estate Management companies (Cushman & Wakefield, Savills), DNOs (SPEN, SSEN), GDNs (Cadent), Gov/Policy (Ofgem, DESNZ), Non profit (BHESCO), Engineering specialists (Kensa, SMS PLC, UKPN Services, Heat Pump Federation)	April 2023-July 2023, October 2023-March 2024
Heat	Indus	Enable decarbonisation of industry through the development of industrial net zero hubs	Local authorities (Peterborough City Council, Norfolk City Council, New Anglia LEP), Industrial Developer (Vengrove), Heat Network Operators (Metropolitan), Industrial sites (Lotus Cars, Hethel Innovation Centre, British Sugar, Palm Paper, Lawrence David), DNOs (SPEN), GDNs (Cadent), iDNOs (ESP, Eclipse Power, Gtc), ICPs (UKPN Services, SOS Electrical Contractor)	April 2023-July 2023, October 2023-March 2024
Transport	Lightspeed	The project will develop a bidirectional EV charging solution that can support both smart charging and V2X capabilities, while providing rapid EV charging without the need for major network upgrades. The solution will help ensure that DNOs are not a blocker to Net Zero.	Brighton & Hove City Council, Liverpool City Council, 100x ev drivers	April 2023-July 2023, October 2023-March 2024

Category	Context or Project Name	Description of the engagement	Stakeholder	Engagement Time period
Transport	Park & Flex	Park&Flex will investigate the potential to access flexibility services from EVs in car parks, and in turn, enable the connection of low carbon demand and generation quickly and efficiently by deferring or avoiding costly network investment. Potential grid services may include energy balancing, ancillary services, and addressing local network constraints such as absorption of local generation at times of high renewable output.	Greater London Authority, Stanstead Airport, Gatwick Airport, Honda, Nissan, ABB, Eaton, Drax, Piclo, UKPN Services	April 2023-July 2023, October 2023-March 2024
Heat	SHIELD: Smart Heat and Intelligent Energy in Low-Income Districts	SHIELD will help to decarbonise heat and energy for vulnerable consumers and social housing tenants. This will be achieved by validating that a new social ESCo business model combined with a range of innovative LCTs provides a sustainable blueprint leading to a more just and equitable energy transition. SHIELD will use low-cost, low-carbon heating solutions, such as distributed data centres. In addition, it will deploy smart energy generation and storage technologies to intelligently balance demand and supply, helping reduce the upfront cost and running costs for consumers' heating and energy.	Local authorities (Essex County Council), LCT providers (Thermify, Kensa, Ridgeblade), Housing Associations (Eastlight + 5 others), ENWL	April 2023-July 2023, October 2023-March 2024
Heat	Watt Heat	Watt Heat project seeks to understand and develop propositions which would make thermal storage assets and flexibility services attractive to end-users as the UK decarbonises home heating	GLA, NG ESO, 23x heat LCT device providers, energy suppliers (E.on, E.on Next, Scottish Power, BG/Centrica, Ovo, Fuse, 100Green, Rebel Energy), aggregators (Axle)	April 2023-July 2023, October 2023-March 2024
Heat	Carbon Flex	Demonstrate how socially inclusive demand-side flexibility can be used to support net zero. 'Carbon flexing' algorithms will be coupled with smart controls to match electric residential space and hot water heating demand in multi-occupancy buildings with periods of low carbon electricity and an expected high network flexibility demand	Local authorities/social housing landlords (Royal Borough of Kensington and Chelsea, GLA), RSLs, heat flexibility/technologies (PeerCarbon, Energy Unlocked), Heat service provider (Connected Response)	March 2024-May 2024
Heat, Transport	CLIP	Project CLIP is a Community Energy Planning project, that aims to provide Community Groups with the framework, data, and tooling to plan for deployment of LCTs at a community level. It aims to draw efficiencies by combining communities into clusters to ensure plans can be scoped, approved and implemented consistently and cost effectively.	Essex County Council	March 2024-May 2024
Transport	Electric Thames	Project Electric Thames will map out the future of the electricity system around the Thames and explore new technologies such as Boat-to-Grid (B2G) services. The outcomes will shape a whole-system planning framework for our waterways, offering insights for decarbonisation and electrification that can be replicated across GB.	Port of London Authority, National Maritime, Local Authorities around Thames (GLA)	March 2024-May 2024
Heat	Flex Direct	Develop novel commercial models and coordinated market approaches to enable LAs and SHPs to operate as flexibility aggregators in direct contract with DSOs using Energy Efficiency for the Sustain Product.	Local Authorities (Basildon Council, Camden Council, Westminster City Council, South Oxfordshire District Council, Royal Borough of Kensington & Chelsea)	March 2024-May 2024
Heat	HeatNet	Develop novel machine learning tools to coordinate heat pump operation to help regulate voltage-drops	Passiv UK	March 2024-May 2024
Heat, Transport	KnowMyFlex	Develop energy flexibility certificates for domestic properties (similar to EPC ratings) to show their potential to participate in flex markets.	GLA	March 2024-May 2024
Heat	OptiHeat	Develop innovative tool that optimises home upgrade recommendations including building fabric, heat pump sizing and other LCTs	EDF	March 2024-May 2024
Heat, Other	WASH: WAstewater Sourced Heat	Investigate using waste heat from wastewater to improve efficiency of heat networks	Water utilities (Anglian Water, Thames Water, Scottish Water, Severn Trent, Southern Water), Heat Network Operators (Eneco, Heatweb, Vital Energy, Clyde Gateway), Local Authorities (Barnett Council, GLA)	March 2024-May 2024
Heat	Neat Heat	Understand thermal storage-based heating impact on customers and network	OVO, tepeo	September 2022-June 2024
Heat, Transport	Local Area Energy Planning Tool (CLEO)	Project CLEO has developed a Local Area Energy Planning tool for Local Authorities to use to help them achieve their net zero targets. The tool known as Your Local Net Zero Hub, is a geo-spatial software solution that includes a variety different datasets from UK Power Networks own data, third party data and local authorities own datasets. Local Authorities can enable a combination of datasets to assess the potential placement of LCTs in their areas and assessing the impact of such projects	133x local authorities within UK Power Networks licence area	March 2022-July 2024
Transport	Shift 2.0	The rapid uptake of LCTs is likely to cause secondary peaks, herding behaviour and congestion in certain parts of the network. Shift 2.0 will look at the potential for dynamic and locational pricing to address these issues, and how any options can complement flexibility procurement.	Octopus, ev.energy	August 2023-May 2024

Category	Context or Project Name	Description of the engagement	Stakeholder	Engagement Time period
Heat	Flex Heat Network	The project investigates how all-electric heat networks could affect the power grid and how the Distribution Network Operator can manage them flexibly. The project will conduct a thorough analysis to determine if it's possible to free up capacity in the network by using a smarter design that's suitable for flexible connections. UK Power Networks will partner with a Heat Network developer/operator that has an operational heat network in the area to test and validate a design optimization methodology through a one-year trial.	Heat Network Operators (Equans), Local Authority (Islington Council), Consultants (Arup)	July 2023-August 2025

7.6. Annex F – LAEP Open Data Page data provision examples

Some examples of helpful information, which is not about the electricity network, that is provided in the interest of potentially useful comparison, map overlays or administration of open data operations include:

- [Case Studies using the LAEP Open Data Page](#) - provides a compilation of local authority and LAEP practitioner case studies using the UK Power Networks' LAEP Open Data Page.
- [Local Authorities and County Councils within UK Power Networks licence areas](#) - shapefile showing local authority boundaries within the UK Power Networks area (across all licence areas). District/Borough councils, Unitary Authorities, and County Councils are shown. Local Authority boundaries are unclipped, meaning the entire boundary is shown - even if the majority of the boundary is outside our licence area.
- [Net Zero Use Cases and Data Requirements](#) - following the identification of Local Area Energy Planning (LAEP) use cases, this dataset lists the data sources and/or information that could help facilitate this research.
- [A Local Authority's Guide to Flexibility](#) - a reference document produced specifically to support local authorities understand flexibility and how to effectively participate.

7.7. Annex G – Exemplary list of regional engagement campaigns

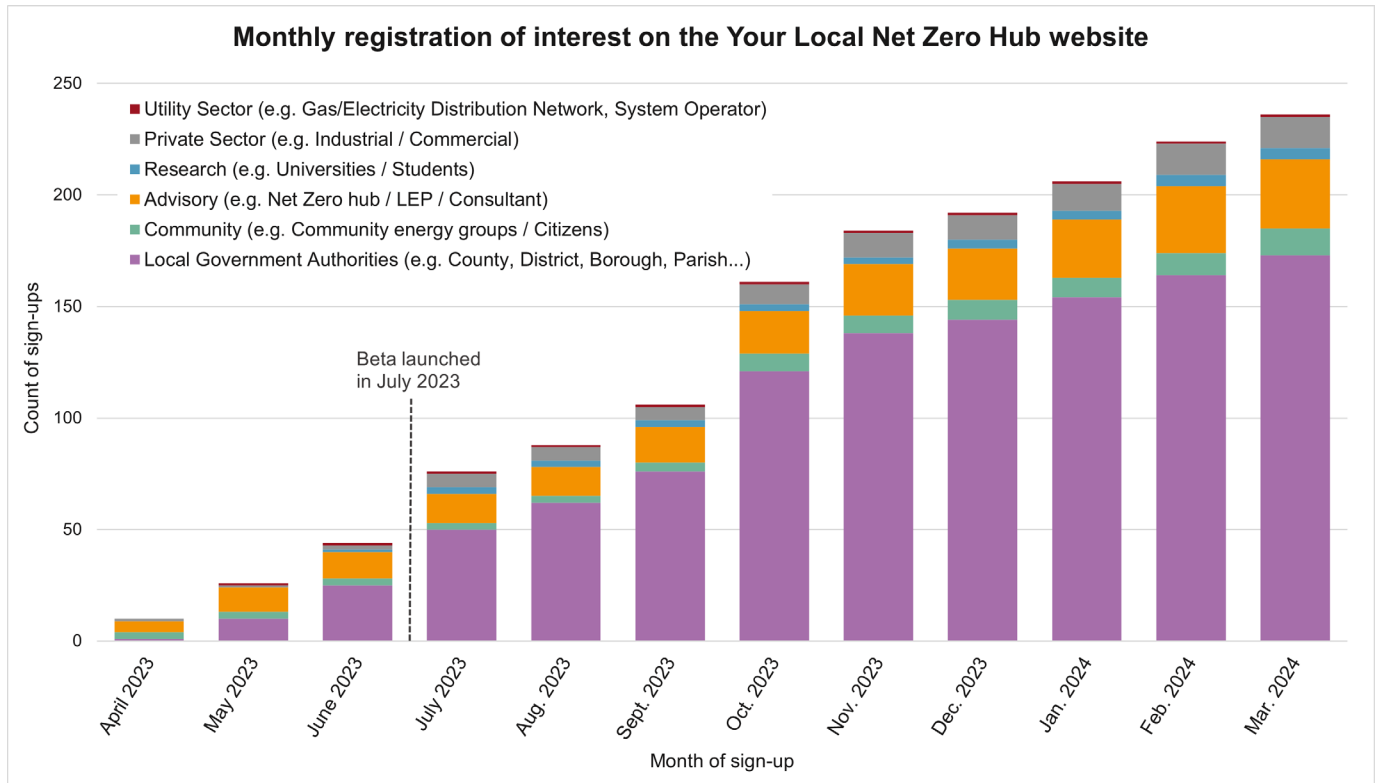
The below table provides some examples of UK Power Networks' regional engagement campaigns, outlining the overarching campaign, date of event, audience, sign-up link, and historical record of email invitation sent.

Campaign	Date of event	Audience	Link to sign-up	Email invitation sent
LAEP Open Data webinar – Regen	15/06/2023	General inc. Local Authorities, LAEP practitioners etc.	The role of open data in enabling net zero planning Tickets, Thu 15 Jun 2023 at 10:00 Eventbrite	createsend.com/t/j-4F6567243531881C2540EF23F30FEDED
Breakfast briefing	08/12/2023	LAEP Practitioners	Net Zero Planning Breakfast Briefing Tickets, Fri 8 Dec 2023 at 10:00 Eventbrite	createsend.com/t/j-EAA4988FBBC32ACA2540EF23F30FEDED Wrap-up email: createsend.com/t/j-0850D1ECC7B1849C2540EF23F30FEDED
Regional Engagement kick off webinar	05/10/2023	Local Authorities	Net Zero Regional Engagement Webinar Tickets, Thu 5 Oct 2023 at 10:00 Eventbrite	createsend.com/t/j-6DC8C6066C79FCB52540EF23F30FEDED Wrap-up email: createsend.com/t/j-712747EBCED087772540EF23F30FEDED
Regional engagement sessions accompanying material	Between 10/10/2023 and 23/10/2023	Local Authorities	Sent invites via email as Teams invites	Pre-reads: Regional Engagement pre-reads (d11f1oz5vvd9r.cloudfront.net) Wrap-up email: createsend.com/t/j-B471D69A3E1E97392540EF23F30FEDED
Local Net Zero Webinar	07/03/2024	Local Authorities	Local Net Zero Webinar Tickets, Thu 7 Mar 2024 at 14:00 Eventbrite	createsend.com/t/j-EFFF38EEFCF817F42540EF23F30FEDED Wrap-up email: createsend.com/t/j-A9ED650542C63912540EF23F30FEDED

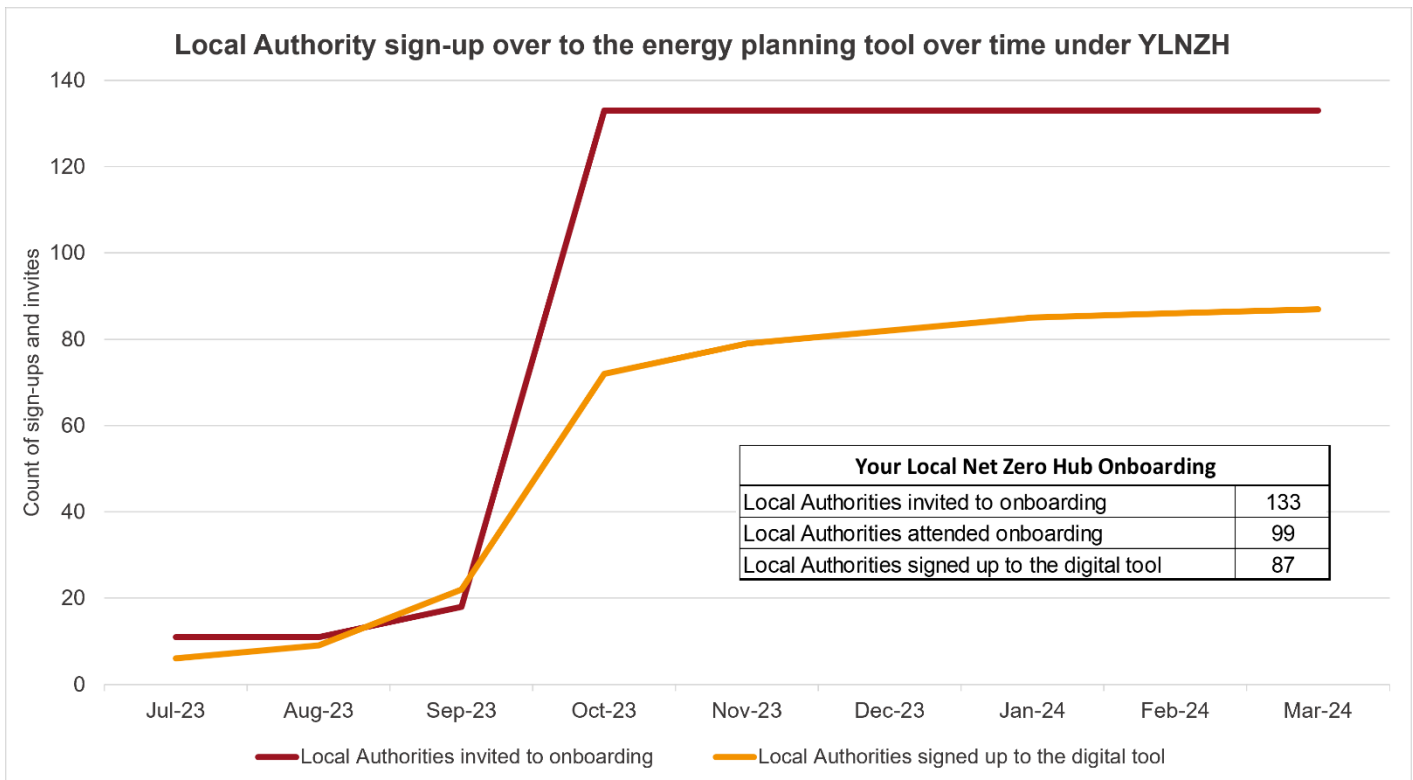
7.8. Annex H – Overview of Your Local Net Zero Hub microsite registrations and LA sign-ups to the energy planning tool

The below provides an example piece of evidence on how we are, on an ongoing basis, engaging with our stakeholders (in this case, Local Authorities). The below two graphs give a high-level overview to the interest and engagement in the (i) Your Local Net Zero Hub and (ii) the energy planning tool to demonstrate how we are enabling self-service access to our datasets and develop an understanding of our stakeholder needs.

(i) Registration of interest over time by Local Authorities and other stakeholders on the Your Local Net Zero Hub (Beta refers to when access to the energy planning tool was released):

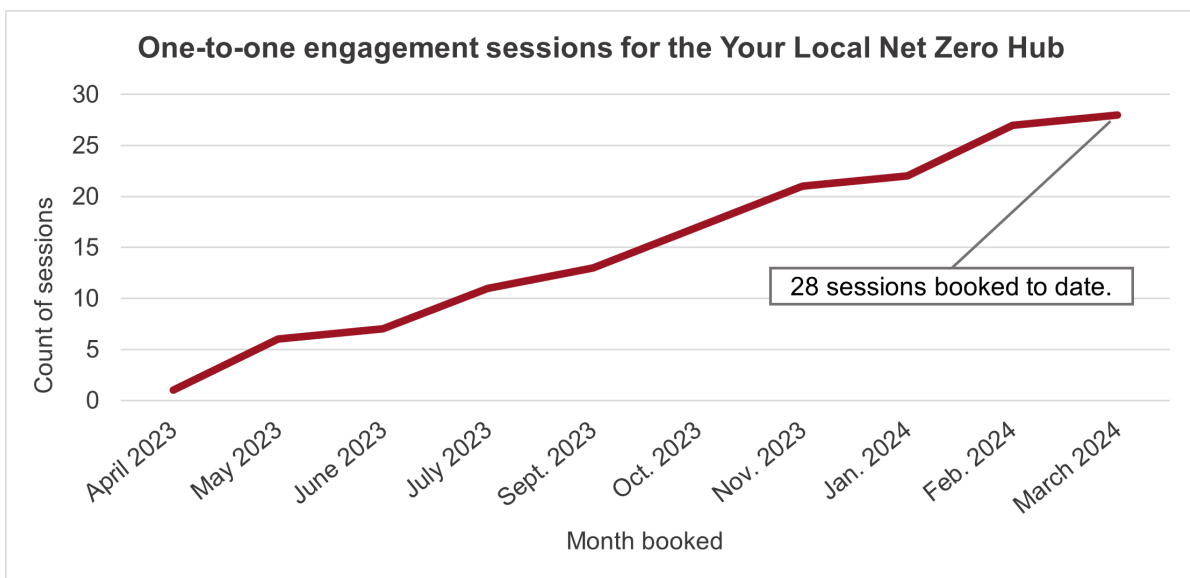


(ii) Cumulative Local Authority registration over time since the energy planning tool release in July 2023:



7.9. Annex I – One-to-one engagement meetings booked over time via the Your Local Net Zero Hub Contact Us website.

28 one-to-one (1-2-1) engagement meetings have been booked over the last year through the Contact Us website as part of the Your Local Net Zero Hub. Please note that this is in addition to other engagement / meetings to support local authorities as shown in Annex G.





Registered Office:
Newington House
237 Southwark Bridge Road
London SE1 6NP

Registered in England and Wales No: 3870728

Company:
UK Power Networks (Operations) Limited

DSO

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