SSEN DISTRIBUTION

NETWORK INNOVATION ALLOWANCE

SUMMARY REPORT

1 APRIL 2024 TO 31 MARCH 2025

Scottish & Southern Electricity Networks

CONTENTS

FOREWORD

SSEN Distribution delivers electricity to almost four million homes and businesses across central southern England and the north of Scotland. We serve some of the most diverse and unique geographies across the UK, keeping our customers and communities connected and supporting the transition to a cleaner, greener future.

Developing a flexible and more robust electricity network is essential to deliver decarbonisation and drive economic growth. In 2024-2025, we continued to develop and deliver a balanced innovation portfolio, designed to meet the evolving needs of our customers and stakeholders, whilst helping the business to adapt to a rapidly changing market. This has helped SSEN Distribution develop new capabilities to meet future challenges and implement new solutions to make the business more efficient and deliver benefits for consumers and the wider environment.

We are focused on delivering value for money for our customers, while helping ensure the shift to clean energy is fair and affordable. Our innovation portfolio continues to focus on decarbonisation while promoting fairness, inclusivity, and equality in line with the Energy Networks Innovation Strategy (https://smarter.energynetworks.org/energy-networks-innovation-strategy-2024/). We are committed to driving efficiency in our business and improving our environmental performance, as showcased through key projects in our innovation portfolio.

Our award-winning HOMEflex project (https://smarter.energynetworks.org/projects/nia_ssen_0061) addresses potential gaps in ensuring fairness for our customers during the development of domestic Flexibility Services. The Code of Conduct, developed as a part of this project, has been shared with industry and has been fully embedded into requirements for the procurement and operation of flexibility services. While publishing this piece of work, Charlotte Roniger, the Scheme Manager at Flex Assure, said: "We're delighted to publish HOMEflex's final recommendations report marking a pivotal step toward a fair, transparent, and consumer-focused domestic flexibility market. This work lays the foundation for a voluntary compliance scheme that will help prepare the sector for upcoming government licensing."

The RESOP project (https://smarter.energynetworks.org/projects/nia_ssen_0071/) continues to break new ground, and the tools developed in the project are being incorporated into SSEN's Local Energy Net Zero Accelerator (LENZA) platform. LENZA is designed to support users in their strategic energy planning endeavours, including the creation of Local Area Energy Plans (LAEPs) and, where relevant, Local Heat and Energy Efficiency Strategies (LHEES). Across our two license areas, over 94% of our local authorities have enrolled to use the LENZA platform, with over 450 active users. Mark Saunders from Oxfordshire City Council said: "Oxfordshire sees the power and benefits of the LENZA platform, and it will form a central plank of our LAEP work and the development of our internal LAEP capabilities going forward. LENZA is already used by many people in councils across the county to understand network topography, visualising network scenarios and modelling the impact of local projects."

The learning from our Near Real-time Data Access (NeRDA) 2 (https://smarter.energynetworks.org/projects/nia_ssen_0070) project is already being used to support our Open Data commitments and is being incorporated into Business as Usual (BaU) to share data from our growing range of network monitoring devices, with over 11,500 visitors to our Open Data Portal (https://data.ssen.co.uk). Currently, NeRDA makes 8 million points of network data available in real-time to our stakeholders who find it 'seamless' to use. Omid Mousavi, the Lead Data Scientist from KrakenFlex, said: "I've been using the NeRDA data for day ahead and half-hourly ahead grid load forecasting, and then calculating a dynamic grid tariff.

This enables the control of flexibilities within the distribution network (such as EVs, heat storages, and heat pumps) to mitigate distribution grid congestion. The NeRDA API operates seamlessly, and the team's responsiveness and assistance have been exemplary."

In 2024-2025, we have continued to work with a wide range of project partners and stakeholders to develop and co-create our innovation projects to ensure that we are addressing their needs.

For further details on our approach to innovation going forward, or if you have an idea or area where you think we should be focusing, then we want to hear from you via **https://www.ssen-innovation.co.uk**

Stewart A Reid
Head of Future Networks
Scottish and Southern Electricity Networks

PROJECT RECOGNITION

We are proud of all of the work we do to strive towards a cleaner, greener future, and in 2024-25 some of our projects received recognition for their innovative approach towards achieving this.

Decentralised Energy Awards 2024
WINNER: Energy Smart Places Award

HOMEflex by SSEN Distribution and Flex Assure continues to gain momentum. The project was developed to ensure that the domestic flexibility market is inclusive, fair and transparent, with clear lines of accountability. HOMEflex will ensure that consistency and quality of service are an essential part of flexibility service provision, guaranteeing that customers are protected, respected and rewarded.

Utility Week Awards 2024
WINNER: Net Zero Engagement Award

Local Energy Net Zero Accelerator (LENZA) is a tool which is transforming local planning in our communities, by empowering decision makers to make the best informed and most efficient decisions on new net zero development.

Our LENZA tool also received recognition in 2024-25 as a finalist in many categories across various award ceremonies.

UK Green Business Awards 2025
FINALIST: Low Carbon Industrial Project of the Year
FINALIST: Innovation of the year

UK Green Business Awards 2024
FINALIST: Low Carbon Industrial Project of the Year
FINALIST: Renewable Energy Project of the Year

British Renewable Energy Awards 2025
FINALIST: Project of the year

Regen Green Energy Awards 2024
FINALIST: Whole System Technology Innovation

Unlock Net Zero Awards 2025
FINALIST: Collaboration of the year

Utility Week's Flex Awards 2025
FINALIST: Flexibility Inclusion Award
For our Demand Diversification Service project

Providing a valued and trusted service for all of our customers is a key component of our innovation strategy and our efforts were recognised at the Utility Week's Flex Awards in 2025 when our Demand Diversification Service Project was a finalist for the Flexibility Inclusion Award.

OUR INNOVATION STRATEGY

Effective innovation is pivotal to our ability to deliver our strategic objectives. These objectives remain at the core of our Innovation Strategy, in order to achieve maximum benefit to our customers.

DELIVERING A SAFE, RESILIENT AND RESPONSIVE NETWORK

Understanding the health of our existing assets is key to improving our overall network reliability through better coordination of remedial and investment actions. We are developing new approaches to monitor the health of our assets, to enable us to better understand the condition and anticipate failure, allowing us to proactively intervene, thus minimising customer disruption.

The HV Feeder monitoring to pre-empt faults project, where we partnered with UK Power Networks, has developed new techniques to monitor the HV network and significantly improve our fault location capability and potentially even anticipate faults before they cause disruption to our customers. Following a successful application through Ofgem's Uncertain Costs Mechanism (Storm Arwen Reopener), 200 HV feeders will be monitored across the SSEN networks, significantly improving resilience and reducing disruption for our customers. Alongside this, we continue to refine our underground fault location capabilities, building on our earlier SYNAPS 2 project.

PROVIDING A VALUED AND TRUSTED SERVICE FOR CUSTOMERS AND COMMUNITIES

In our Demand Diversification Service for Load Managed Areas (LMAs) projects, we are exploring an alternative approach to managing demand within LMAs. LMAs were initially introduced to enhance network diversity, particularly in response to the growing demand from storage heating systems. However, as the energy industry has evolved, LMAs have become increasingly outdated, limiting consumers' access to a broader range of tariff options and restricting their ability to participate in emerging flexibility markets. As a result, alternative market-based approaches to managing and diversifying demand are being explored. We are now working with several Flexibility Service Providers to trial alternative market-based approaches to assess their suitability for wider deployment.

MAKING A POSITIVE IMPACT ON SOCIETY

In our Equal LCT (Low Carbon Technologies) NIA project, we have begun to uncover new ways to provide access to LCT and Energy Efficiency measures to consumer segments that are most likely to be excluded from the net zero transition so that they can benefit from its opportunities. These will take the form of propositions for products and services supported by innovative business models that improve returns for providers investing in solutions for these consumers. In the project, we engaged with a broad range of stakeholders and industry experts to identify options for new business models that are tailored for specific consumer groups. We are now further developing these concepts in a Strategic Investment Fund (SIF) Alpha project. This SIF project is looking at aligning heat pump installations with energy efficiency measures to reduce the impact of peak heat demand on the network.

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

Our LCT Connection Readiness Indicator project is looking to help overcome an initial barrier to Low Carbon Technology (LCT) uptake by helping customers to easily understand how ready a property is to connect an LCT, and give them the ability to request that a Distribution Network Operator (DNO) proactively carries out works to upgrade fuses/ cut-outs/looped services to remove the potential for delays when they eventually look to install an LCT.

This will help customers avoid facing a "distressed purchase" scenario where their existing heating system fails, and only then are they made aware of the timescales involved in upgrading any fuses/ cut-outs or removing looped services required to adopt LCT. The project also aims to demonstrate how having access to data on incumbent heating systems can help DNOs improve network investment activities.

NIA PROJECTS

In the year ending 31 March 2025, there were 15 projects funded under SEPD and SHEPD Network Innovation Allowance. Of these, 12 projects were led by us and the remaining three were managed by other licensees.

Each project accumulates knowledge and learning which aligns with one or more of our Strategic Objectives. The relevant primary Strategic Objective is denoted via the inclusion of its icon.

DELIVERING A SAFE, RESILIENT AND RESPONSIVE NETWORK

PROVIDING A VALUED AND TRUSTED SERVICE FOR CUSTOMERS AND COMMUNITIES

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

MAKING A POSITIVE IMPACT ON SOCIETY

ExtenDER

NIA SSEN 0067

KEY ACTIVITIES

The ExtenDER Project is testing the feasibility of a market based connection agreement to allow customers to connect earlier under Transmission constraints by enabling peer-to-peer trading of flexibility. A detailed report on the mechanisms of a Neutral Market Facilitator (NMF) to facilitate peer-to-peer trading is available upon request, and a summary of this is available in the NMF Project Closedown Report via the Smarter Networks Portal. The report goes into detail on:

1. Market-Based Connections Product Overview
2. Commercial Design, Market Design and Gaming Risks
3. Stakeholder Engagement
4. Cost-Benefit Analysis

EXPECTED BENEFITS

During Phase 2 it was established there was an inability to realise the expected benefits, and it was deemed there was no viable route to Business as Usual.

PROGRESS

The ExtenDER Project was closed early and did not go through the live trial period as initially planned. Various obstacles existed, such as Low Technology Readiness Level (TRL), no business appetite for the tool, high risk of allowing the market to facilitate connections in constrained locations, and the requirement of wider ENA consensus for a market-based approach to be adopted to change commercial processes. Crucially, the use case for connecting houses was not feasible as market-based connection agreement obligations could not be transferred from property developers to domestic consumers, which meant the anticipated benefits described in the Project Eligibility Assessment (PEA) document could not materialise.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

Baringa
Brighter together

ELECTRON

PROJECT BUDGET
£1,410,000

START/END DATE
August 2023 – December 2025

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0067

PROJECT MANAGER
Rhys Williams

NEW APPROACH TO LOSSES

NIA SSEN 0068

KEY ACTIVITIES

The SHEPD licence area exports power to the transmission system in various locations and during differ times of the year. There was uncertainty as to whether the existing losses apportionment methodology was designed to manage reverse power flows. The 'New Approach to Losses' project was initiated to investigate the accuracy of the existing losses apportionment methodology and, if necessary, to create a new losses apportionment methodology, along with supporting engineering models and prepare them to a standard where they can be submitted to Elexon for approval.

EXPECTED BENEFITS

Although no net benefits were expected, the project has ensured that there is a more equitable distribution of the value of losses across the customer base in SSEN networks. This was required to address the increasing generation/ reverse power flows the networks are experiencing which were not adequately addressed by the previous method.

PROGRESS

Early investigations found that the existing losses apportionment methodology was not designed to handle reverse power flow and therefore a new model was required to produce more accurate results. An investigation of the engineering models that were used to calculate losses showed that they were appropriate and so no changes were required. This project is now complete.

A new losses apportionment methodology was created that took account for both downward and upward flows of power, onto or from, the distribution system from the transmission network. This underwent significant testing to demonstrate that the results it produced were robust. The methodology was submitted to Elexon and approved, and was then used to calculate the 2025/26 Loss Adjustment Factors that were subsequently published.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATOR

Capgemini

PROJECT BUDGET
£390,000

START/END DATE
September 2023 – October 2024

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0068

PROJECT MANAGER
Ross Bibby

LOW VOLTAGE POWER QUALITY

NIA SSEN 0069

KEY ACTIVITIES

The Low Voltage Power Quality (LVPQ) project aims to test a range of devices that can restore power quality and boost network capacity. Power quality is impacted by new demands on the network including Low Carbon Technologies (LCTs), which can cause issues with harmonics, voltage, and phase balance. Conventional reinforcement solutions take time and may not always be the most economical solution. Therefore, alongside flexibility, we need a suite of technology-based solutions to address these power quality issues.

Testing of these will occur at the Power Networks Demonstration Centre (PNDC) and in SSEN's network areas. The project will also develop the processes for the rapid assessment, selection and installation of the most appropriate solutions. The project has decided to focus on the impact of heat pumps on the network, especially when added as a retrofit heating system to older homes.

EXPECTED BENEFITS

The main benefit to consumers will be the development of a more resilient network and a reduction in delays to the installation of LCT due to the requirement for time consuming reinforcement work. It will directly inform the new interventions we will use in ED3.

PROGRESS

Work Package 1: We have now installed 15 power quality monitors in residential properties. These will communicate for up to a year and will provide power quality information to be used in future work packages. The chosen properties all have at least a heat pump, with several having more than one form of low carbon technology.

Work Packages 2–4: These three work packages relate to obtaining power quality information from heat pumps at the PNDC, to complete the construction of an electrical model to be used in work package 5. Four heat pumps have been provided by different manufacturers. These have been run through several scenarios to help us understand the additive and reductive nature of harmonics when combined with several LCTs.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

University of Strathclyde PNDC

Threepwood Consulting

Catapult Energy Systems

Outram

PROJECT BUDGET
£1,018,500

START/END DATE
October 2023 – May 2026

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0069

PROJECT MANAGER
Phil Clarke

NEAR REAL-TIME DATA ACCESS 2 (NeRDA 2)

NIA SSEN 0070

KEY ACTIVITIES

The NeRDA 2 project will expand the geographical scope of the previous NeRDA project (https://smarter.energynetworks.org/projects/nia_ssen_0050) to engage with more stakeholders and understand the value in sharing real-time network data. As well as providing real-time data, NeRDA 2 will provide static data sets through the Application Protocol Interface (API), such as capacity and network configuration. In addition, improvements will be made to the dashboard to make it easier for users to interact with the real-time data and improve their understanding of the level of granularity that they can receive from the NeRDA portal. This will allow the project to assess and understand the value that can be unlocked by stakeholders from accessing the data provided.

EXPECTED BENEFITS

The project's high-level objectives are to provide near real-time network and load model data for both SSEN licence areas by sharing all HV and LV network data that is available. Alongside this real-time data, the project will improve the APIs to provide users with static data around network configuration and capacity data. Improvements will also be made to the NeRDA dashboards to allow users to easily interact with the network data and understand the different levels of data that are available to them.

PROGRESS

NeRDA 2 is successfully providing real-time network data across both SSEN license areas. Over the past 12 months NeRDA 2 has increased the amount of network data available to stakeholders to eight million data points:

- Real-time data from over 5,000 secondary substations.
- A new interactive dashboard platform has been deployed, making it easier for users to search for the specific data that they are interested in. This was informed by a face-to-face stakeholder event held in London, and can be accessed via: https://nerda.ssen.co.uk
- The API authentication has been changed to a barrier token to increase security.
- Data has been made available through NeRDA 2 for the Orkney Active Network Management schemes.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

Open Grid Systems

University of Strathclyde Glasgow

aspentech

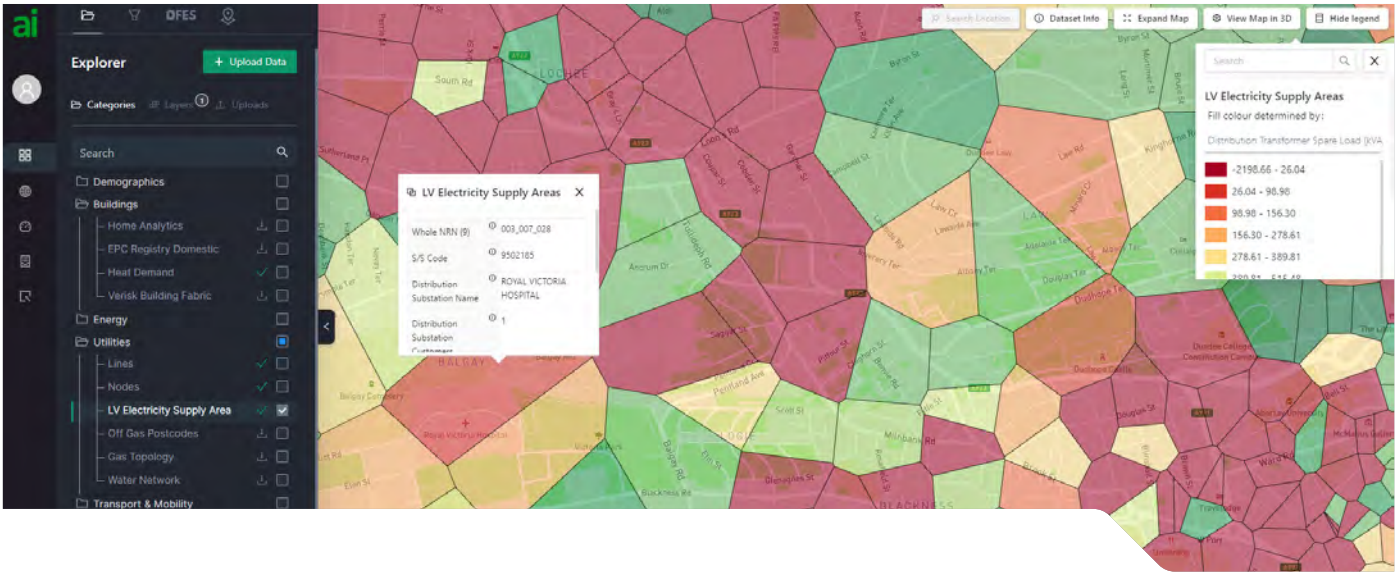
PROJECT BUDGET
£495,000

START/END DATE
August 2023 – March 2026

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0070

PROJECT MANAGER
Fraser MacIntyre

REGIONAL ENERGY SYSTEM OPTIMISATION PLANNING (RESOP) NIA SSEN 0071



KEY ACTIVITIES

This project is a follow on in a series of associated previous projects including Whole System Growth Scenario Modelling (NIA_SSEN_0030) and Whole System Growth Scenario Modelling Phase 2 (https://smarter.energynetworks.org/projects/nia_ssen_0043/). These projects have developed a methodology for digital local area energy planning on a whole system basis, and undertake the following activities:

- Develop the Local Energy Net Zero Accelerator (LENZA) tool, so that it can be used to create digital Local Area Energy Plans (LAEPs).
- Work with Scottish Local Authorities (LAs) and the Department of Energy Security and Net Zero (DESNZ) to geographically display locations of potential Heat Networks.
- Make LENZA available to all Local Authorities within SSEN's network area to increase testing, bug fix and feature requests e.g. forecasting functionality so that it becomes Business as Usual (BaU) ready.

EXPECTED BENEFITS

The main expected project outcome is to enable LENZA to create digital LAEPs at a higher granularity and greater accuracy than current methods used by consultants and to enable all Local Authorities within SSEN's geography to make use of this functionality for improved investment planning.

PROGRESS

Significant progress has been achieved to date including:

- Winchester Council has begun work on the UK's first digital LAEP;
- DESNZ Heat Network data being trialled with Winchester Council as part of the Digital LAEP; for Sustainable Energy (CSE) have replicated the DESNZ Heat Network data methodology for all of Scotland to be used by LAs;
- PowerFactory and LENZA have been integrated and testing of the API continues;
- LENZA has been offered to all LAs in SSEN network areas and is being used by >90% of them; and
- Regen have created a detailed methodology on how LENZA data can support DFES submissions.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

advanced infrastructure, DNV, Field Dynamics, IA, centre for sustainable energy, UrbanTide, faculty, wsp, REGEN, Landmark Information Group

PROJECT BUDGET
£2.9 million

START/END DATE
October 2023 – October 2025

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0071

PROJECT MANAGER
Rhys Williams

DEMAND DIVERSIFICATION SERVICE FOR LMAS PHASE 1 NIA SSEN 0072

KEY ACTIVITIES

The aim was to establish if Load Managed Areas (LMAs) can be removed by the introduction of Demand Diversification Services (DDS); where Flexibility Service Providers (FSPs) are incentivised to provide enduring demand diversification to areas of the network that are, or will be, constrained and at the same time enable consumers within LMAs to participate in the electricity market and transition to Low Carbon Technologies (LCTs) at their discretion. This will be achieved by detailed network analytics, technical trials, and simulation exercises that are designed to gather early feedback on the feasibility of DDS.

EXPECTED BENEFITS

- Confirmation that DDS is technically feasible through the current smart metering infrastructure.
- Stakeholder engagement and gathered feedback, confirming sufficient interest to establish workable market mechanisms.
- That enough FSPs join the simulation exercise,understand DDS, and are therefore willing to provide services when the need is operational rather than an innovation trial.
- Recommendations for next steps; particularly, what is required before DDS can be launched as a Business as Usual (BaU) service.

PROGRESS

Technical trials were descoped from the project because, they could not be completed during the essential winter demand peaks in 2024-25. The requirements for selecting trial participants proved too challenging in the time available. That is for consumers who:

- Were in large enough clusters to see the impact of their loads being scheduled;
- Were in areas of the network with LV monitoring;
- Had a schedulable load; and
- For those with storage heaters, had the new five terminal SMETS2 smart meters.

With hindsight, this was always going to be a tough set of requirements to fully meet.

After confirming that FSPs were interested in participating in the new DDS models and validating, through desktop simulations, that the models were likely to provide the expected impact on network congestion, the project was brought to a close. Recommendations were prepared for the next project phase, which will look at requirements for commercial DDS products and launching DDS as a BaU service.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATOR

Baringa
Brighter together

PROJECT BUDGET
£330,500

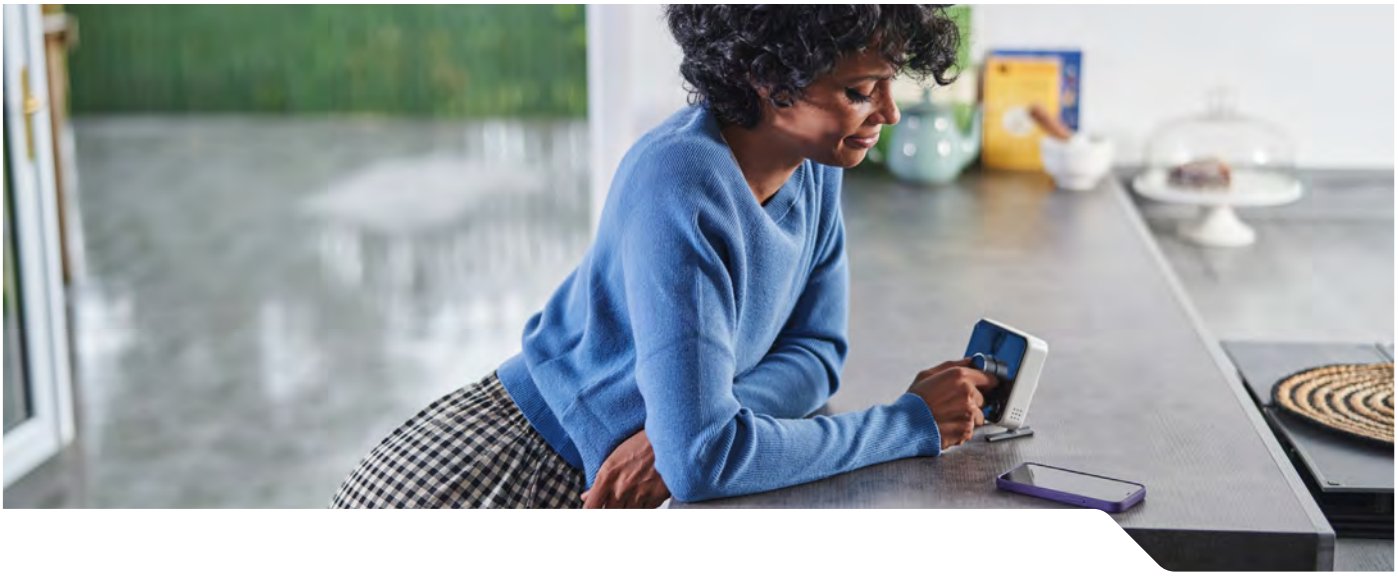
START/END DATE
February 2024 – September 2024

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0072

PROJECT MANAGER
Kevin Stewart

HOMEflex COMPLIANCE

NIA SSEN 0073



KEY ACTIVITIES

The HOMEflex project (https://smarter.energynetworks.org/projects/nia_ssen_0061/) developed the HOMEflex Code of Conduct promoting an inclusive, fair, and transparent domestic flexibility marketplace.

This project has delivered HOMEflex Compliance, recommendations for a Scheme to implement the HOMEflex Code of Conduct and establish standards, help new entrants meet the service levels consumers expect and deserve, and enable electricity networks to confidently procure flexibility ethically, encouraging the domestic flexibility market to grow in a fairer, more sustainable manner.

EXPECTED BENEFITS

UK based research in 2023 from Adobe looks at the cost of broken trust. The research says "British businesses face losing a large portion of their customer base if they don't prioritise trust, with 71% of UK consumers saying they will stop purchasing from a company altogether if their trust is broken." If we equate this to the trust which could be lost in the domestic flexibility market, we can start to work out the benefit of HOMEflex when building and maintaining trust. Of course, as well as HOMEflex, the reputation and trust of the individual companies comes into play. As does the trust in electricity networks as a whole. If we take HOMEflex as being a third of the basis of the trust in future domestic flexibility, we can take the 71% who wouldn't partake without trust to 23.7%. With 23.7% of domestic flexibility at risk without adequate compliance which HOMEflex can deliver, this has a value of nearly £300m per year.

PROGRESS

The project is complete, and the HOMEflex Compliance report details nine recommendations for a successful Compliance Scheme. The report is published at https://www.flexassure.org/homeflex. The project team have developed additional recommendations which are detailed in the project closedown report covering Scheme Design, Governance, Complaints and Dispute Resolution, Scheme Funding, Scheme Company, and Public Awareness. The closedown report is available at https://smarter.energynetworks.org.

PRIMARY STRATEGIC OBJECTIVE

MAKING A POSITIVE IMPACT ON SOCIETY

COLLABORATORS

Flex Assure

centre for sustainable energy

PROJECT BUDGET
£193,000

START/END DATE
March 2024 – March 2025

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0073

PROJECT MANAGER
Simon O'Loughlin

ALTERNATIVE JOINTING 2

NIA SSEN 0075

KEY ACTIVITIES

This project is divided into to two key stages:

Stage 1: Development of foam compounds, shell and a shrink wrap LV straight joint to pass the required standard BS EN 50393:2015 and tests set by the ENA (C81).

Provide health and safety assessments on new materials/ processes and report cost breakdowns of the final product based on testing the products in an operational environment.

Stage 2: Deliver field trials of successful new LV straight joints and develop and test prototypes of other joint types including breach, service and multiple service.

EXPECTED BENEFITS

The energy system transition requires the large-scale deployment of LCTs within SSEN's licence areas, resulting in increased load and a consequential increase in LV jointing activity. Improving the efficiency and reducing the waste and carbon footprint of LV jointing would therefore provide benefits to customers and enable a faster and more effective energy system transition.

PROGRESS

Foam material development and testing is underway. The project is seven months into its four-year schedule and no major outcomes are available at this stage.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

ENERGY INNOVATION CENTRE

TE connectivity

nationalgrid Electricity Distribution

sicame ENERGIE

Prysmian Group

HIVE

PROJECT BUDGET
£2,470,000

START/END DATE
July 2024 – June 2028

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0075-1

PROJECT MANAGER
Timothy Watts

EQUAL LCTs

NIA SSEN 0076

KEY ACTIVITIES

Equal LCT identifies consumer groups at risk of being left behind in the energy transition, focusing on their electricity network needs and proposing commercial products and services to support their access to Low Carbon Technologies (LCTs).

It explores which societal segments are most vulnerable, how best to engage them, which technologies and commercial offerings suit each group, and the barriers to participating in flexibility markets. These insights equip product providers with a deeper understanding of underserved consumers and strategies to effectively reach and support them.

EXPECTED BENEFITS

The project aims to form a consortium of key stakeholders to support a just energy transition. It will clearly define the broader value chain available to consumers post-LCT installation and identify consumer archetypes that can benefit most—prioritising those with the greatest need. For these priority groups, the project will develop tailored models to enable LCT access and design a trial to test the technical and commercial viability of these models, including consumer impact and success metrics.

PROGRESS

This completed project focused on three core workstreams: Understanding the Ecosystem, which involved forming a consortium of industry actors to explore consumer challenges and co-develop solutions; Understanding the Consumers, where six at-risk consumer segments were identified and validated by experts from Baringa and CSE; and Defining the Commercial Models, which explored how these consumers could benefit financially from Low Carbon Technologies (LCTs) and identified barriers to uptake and participation in flexibility markets. The project then developed five high-impact, scalable propositions from an initial list of ten: Targeted Community Energy Scheme, Utilisation of Local Heat Sources, Domestic Energy Efficiency, Targeted Recruitment into Flex Services, and Shared I&C EV Charging Infrastructure. This research laid the foundation for a follow-up SIF Alpha project, now underway, https://smarter.energynetworks.org/projects/10145484/. This project looks at ways to use flexibility to reduce peak heat demand on the network.

PRIMARY STRATEGIC OBJECTIVE

MAKING A POSITIVE IMPACT ON SOCIETY

COLLABORATORS

Baringa
Brighter together

centre for sustainable energy

PROJECT BUDGET
£532,125

START/END DATE
February 2024 – November 2024

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0076

PROJECT MANAGER
Ross Bibby

LCT CONNECTIONS READINESS INDICATOR

NIA SSEN 0077

KEY ACTIVITIES

In Part 1 of the project, we will develop the logic for the LCT Connections Readiness Indicator. This is a combination of a logic flow creating a hierarchical/decision tree model that uses known looped services/fuse ratings with assumptions to infer likelihood where data is not present, along with machine learning to improve the outputs. The logic will be tested using a range of datasets, and a customer messaging strategy will be developed before testing with customer focus groups via a customer experience design company to ensure efficacy. In Part 2 we will carry out a field trial to test the methodology with real customers, measuring their sentiment towards the LCT Connections Readiness Indicator information, their engagement with SSEN, as well as our ability to update the information we hold and carry out proactive asset upgrades.

EXPECTED BENEFITS

LCT Connection Readiness Indicator could deliver £2.1m of net benefits in SSEN network areas by 2030 by reducing delays and complaints associated with LCT connections.

PROGRESS

The project has carried out extensive customer research around the concept and the messaging strategy, and this Customer Research Findings report is now published at https://smarter.energynetworks.org/projects/nia_ssen_0077.

The project has modelled 85% of missing service cable data and 82% of missing cut-out rating data in SHEPD, and 96% of missing service cable data and 98% of missing cut-out rating data in SEPD.

The project has produced LCT Connections Readiness Indicator data for 98% of properties in SSEN's licence areas.

The project is now preparing to launch a field trial to evaluate customer sentiment further and enable additional improvements to the modelling.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

Centre for Net Zero
Powered by Octopus Energy Group

impact

HPF
HEAT PUMP FEDERATION

PROJECT BUDGET
£555,575

START/END DATE
October 2024 – April 2026

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0077

PROJECT MANAGER
Richard Hartshorn

DEMAND DIVERSIFICATION SERVICE FOR LMAS PHASE 2 – COMMERCIAL TRIALS NIA SSEN 0078

KEY ACTIVITIES

Virtual Networks Trials

The project has been working with the Power Networks Development Centre (PNDC) and the Energy Systems Catapult Living Laboratory (ESCLL) to model various virtual network configurations. By using real world data captured from ESCLL volunteers, the project has analysed the impact of Demand Diversification Service (DDS) across a wide range of loads and at various penetrations of the network.

Field Trials

Non-geographic Field Trials will be run with Flexibility Service Providers (FSP). Aggregate demand data will be applied to simulated transformers to gauge the ability of FSPs, individually and as a group, to impact the demand profile on the transformer.

EXPECTED BENEFITS

To clearly establish the next steps for introducing DDS as a BaU service, and its potential to enable the removal of Load Managed Areas.

PROGRESS

As of early June 2025, the Virtual Network Trials have successfully completed four out of six sprints. Three of these have been for the Allocated Capacity (AC) model and one for the Dynamic Congestion Response (DCR) model. To date, the findings confirm the initial premiss that DDS can impact the profile of the demand on the network. However, there are several challenges that will need to be addressed before moving towards a BaU service.

- Uncoordinated smart tariffs have the potential to very quickly create new peaks on the network.
- Most schedulable loads (EVs, heat pumps, batteries, and storage heaters) are being driven to the same Time of Use tariffs, which is exacerbating the issue.
- The initial design of real-time response to congestion in the DCR model looks like it can't react quickly enough and, when multiple FSPs react, it may amplify the peak.
- The shear volume of potential sites for DDS (1000s) may require a new approach to flexibility at LV; supported by new or enhanced systems and processes.

We are now scheduling the first Field Trials. Three suppliers and two aggregators have expressed interest in joining the trials. Another two suppliers are in early discussions.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

UNIVERSITY of STRATHCLYDE PNDC · CATAPULT Energy Systems · connectedresponse

PROJECT BUDGET
£2,200,919

START/END DATE
September 2024 – August 2025

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0078

PROJECT MANAGER
Kevin Stewart

NET ZERO TERMINATION 2 PROJECT

NIA SSEN 0079

KEY ACTIVITIES

This is a follow-on project from the Net Zero Service Termination Project (https://smarter.energynetworks.org/projects/nia_ssen_0055), created to review the learnings and analyse them against the data containing whole customer load information. The original Net Zero Termination project highlighted the impact high loads, consistent with extended use, could have on a single-phase domestic cut-out. The scope of the project is to analyse over 200 customer properties with Low Carbon Technologies (LCTs) and gain greater understanding of the risks these devices may pose to the cut-out or service cables through possible thermal damage.

EXPECTED BENEFITS

The project will be run as a desktop study of the customer consumption data and the collected data from the original Net Zero Termination project. As a result of this project, we expect to have a better understanding of the impact high customer loads, driven by LCT usage, has on our equipment so we can make appropriate action. With this greater understanding of the risks involved and their potential root causes, we can begin to explore solutions for mitigating these risks.

PROGRESS

The desktop study has been completed and the final report has been created. We are now moving ahead with plans to engage with relevant stakeholders within the other DNOs to discuss next steps and how best to use the findings from this project and the first Net Zero Termination project. We will also contact other external stakeholders within the ENAs LCT Steering group and the ENFG.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATOR

ea technology

PROJECT BUDGET
£109,982

START/END DATE
October 2024 – September 2025

WEBSITE
https://smarter.energynetworks.org/projects/nia_ssen_0079

PROJECT MANAGER
Phil Clarke

NIA COLLABORATION PROJECTS LED BY OTHER LICENSEES

Below is a list of other NIA projects that SSEN is participating in. The projects are led by our collaboration partners; further details of those projects can be found via the listed project links or in the relevant annual reports from each Lead Party.

Project number	Project title	Lead party
NIA_SPEN_008	Appeal (Wood preservatives)	SP Energy Networks
https://smarter.energynetworks.org/projects/nia_spen0008		
NIA_NGN_391	L2N Power Heat Alt	Northern Gas Networks
https://smarter.energynetworks.org/projects/nia_ngn_391		
NIA_NGN_422	VVT	Northern Gas Networks
https://smarter.energynetworks.org/projects/nia_ngn_422		

RESILIENCE AS A SERVICE

SSEEN 0079

NIC PROJECTS

In the year ending 31 March 2025, one SHEPD project was funded by the Network Innovation Competition.

KEY ACTIVITIES

The Resilience as a Service – RaaS – innovation project seeks to improve the operational resilience of electricity distribution networks in remote areas.

The aim is to develop and trial a new market-based solution which can swiftly and automatically restore supply to customers in the event of a fault, using services provided by a local Battery Energy Storage System, and incorporating local Distributed Energy Resources.

In addition to demonstrating the technical concept, the work will develop the commercial framework for RaaS – evaluating the financial case from a DNO perspective and assessing the investment case for RaaS Service Providers with options for revenue stacking in other flexibility services markets.

EXPECTED BENEFITS

The application of RaaS would improve Security of Supply for customers, reduce the use of temporary diesel generation, and enhance the use of local renewable schemes, supporting the UK's transition to Net Zero.

PROGRESS

The first phase of the project focused on site selection, system design for the chosen demonstration site, and refinement of the business case for RaaS. The purpose of this stage was to evaluate the technical feasibility and financial viability of the RaaS concept.

Following a positive stage gate decision, the project is now proceeding with the trial phase and deployment of a demonstration scheme for detailed testing and live operation.

PRIMARY STRATEGIC OBJECTIVE

DELIVERING A SAFE, RESILIENT AND RESPONSIVE NETWORK

COLLABORATORS

e·on

COSTAIN

PROJECT BUDGET
£10,900,000

START/END DATE
January 2020 – June 2026

WEBSITE
https://smarter.energynetworks.org/projects/sseen07

PROJECT MANAGER
Sarah Rigby

SIF PROJECTS

In the year ending 31 March 2025, there were 16 SEPD and SHEPD projects funded by the Strategic Innovation Fund. Of these 11 projects were led by us and remaining five were managed by other licensees. Each project accumulates knowledge and learning which aligns with one or more of our Strategic Objectives. The relevant primary Strategic Objective is denoted via the inclusion of its icon.

DELIVERING A SAFE, RESILIENT AND RESPONSIVE NETWORK

MAKING A POSITIVE IMPACT ON SOCIETY

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

PROVIDING A VALUED AND TRUSTED SERVICE FOR CUSTOMERS AND COMMUNITIES

VIVID (VULNERABILITY IDENTIFICATION VIA INFORMATIVE DATA) 10085471

KEY ACTIVITIES

VIVID started to unlock the full potential of data held by the energy industry, local authorities and the third sector for the benefit of people and communities in vulnerable situations. We did this by developing new techniques, using existing data in safe and secure ways to identify which households would most benefit from timely and relevant offers of practical and financial support from their local authority, reputable charities, and responsible energy companies. VIVID also investigated the creation and maintenance of a common regional vulnerability reference system, initially for Aberdeen City, but planned in a way that it could be applied GB wide.

EXPECTED BENEFITS

Applying VIVID would find households who are vulnerable or less resilient so they could be supported and receive the help they need. They would receive support during power cuts and other emergency situations, financial help and support with LCT adoption, digital inclusion and energy efficiency. For DNOs, VIVID would help them to close the PSR Gap and to help customers most in need quicker and more effectively. Likewise, Local Authorities and the third sector who joined VIVID make efficiency savings and provide better levels of support and service to residents, tenants and service users alike.

PROGRESS

VIVID successfully completed the Alpha phase of SIF and delivered the following outputs:

- Identifying barriers to data sharing, devising GDPR compliant solutions and processes to handle data quickly, accurately and securely
- Building and testing the data process from end to end
- Concluding data architecture plans to facilitate a replicable GB wide Vivid system
- Developing ways to incorporate smart meter data and DCC system data under the Smart Energy Code
- Identifying a realistic privacy management and consent process and a way to allow dynamic management of PSR and assistance services.

Being used as part of the VERIFY Beta project.

PRIMARY STRATEGIC OBJECTIVE

MAKING A POSITIVE IMPACT ON SOCIETY

COLLABORATORS

CGI, Aberdeen City Council, e.on, Quarriers, Data Communications Company, UK Power Networks Delivering your electricity

PROJECT BUDGET
SIF £448,525

START/END DATE
October 2023 – April 2024

WEBSITE
https://smarter.energynetworks.org/projects/10085471

PROJECT MANAGER
Simon O'Loughlin

LEO-N (LOCAL ENERGY OXFORDSHIRE – NEIGHBOURHOODS) 10085252

KEY ACTIVITIES

The project accelerates decarbonisation by helping homes, businesses, and communities transition to net zero. Building on Project LEO, it focuses on Smart and Fair Neighbourhoods, placing flexibility services at the core of a smarter, locally balanced energy system.

- **FutureFit – helping consumers decarbonise**
  The Low Carbon Hub, Cosy Homes Oxfordshire, and Energy Solutions Oxfordshire will evolve retrofit services into FutureFit products. These will guide coordinated upgrades in buildings and smart tech, avoiding ineffective piecemeal installations.
- **Helping Communities Transition**
  FutureFit will scale to the community level, enabling local coordination for energy and flexibility trading within a Smart Community Energy System (SCES). LEO-N will explore how to implement this across multiple communities for county-wide impact.
- **Impact on the future electricity network**
  Building on SSEN's Project LEO, LEO-N will assess how large-scale FutureFit adoption affects the network. A key innovation is optimising behind-the-meter measures to maximise existing infrastructure and inform future DNO investments.
- **New Institutional options for delivery and how nested local area energy planning can support the transition**
  Expanding on the Eynsham Local Area Energy Plan (LAEP), LEO-N will use digital tools for energy planning from street to county level. New roles like Local Net Zero Coordinator and SCES Service will support rapid, scalable action.

EXPECTED BENEFITS

LEO-N bridges strategic planning and local delivery at the grid edge, supporting a fair, participative Net Zero transition. It aligns network investments with neighbourhood decarbonisation plans, forecasts network constraints, and enables cost-effective upgrades. A Grid-Edge Coordinator helps communities access tailored pathways and resources. LEO-N's nested model links local plans, LAEPs, and network investments through digital tools and collaboration, reducing uncertainty and unlocking new revenue and flexibility.

PROGRESS

The project completed its Alpha Phase.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

Oxford City Council, Oxfordshire County Council, Baringa, University of Oxford, Retrofit Works, low carbon hub

PROJECT BUDGET
SIF £481,159

START/END DATE
October 2023 – April 2024

WEBSITE
https://smarter.energynetworks.org/projects/10085252

PROJECT MANAGER
Dot Revill

UN:LOCK (UNBLOCKING NETWORKS: LOCAL OPTIMISATION, CONSUMERS AND KNOWLEDGE) 10106218

KEY ACTIVITIES

Project UN:LOCK explored innovative commercial models, data, and digital tools to unlock network capacity and accelerate renewable energy connections. It aimed to support local net zero goals, enable community participation in flexibility markets, and attract new energy businesses.

EXPECTED BENEFITS

The project's main goal was to increase renewable capacity and generation, cutting carbon emissions both locally and across the wider grid. It also aimed to empower consumers to benefit from local flexibility – either through revenue or bill savings by shifting demand.

PROGRESS

Completed in April 2024, UN:LOCK evaluated six mechanisms to create capacity without reinforcing the network. Three were identified for further development:

Option 1. Constraint Managed Zone that procures either Demand Turn Up (DTU) or Generation Turn Down (GTD) flexibility services to mitigate the generation constraint and create additional headroom for new generation to connect.

Options 4 and 5 combined into a single proposal. Use of flexible demand via time-of-use tariffs and smart EV charging to create headroom for new generation.

Option 2.2. Explore enhancements to the Active Network Management (ANM) system, including dynamic management to reduce curtailment limits and support new connections.

Options Assessment Tool. The project also formalised the process into a digital tool. This tool is intended to assist DNOs and local stakeholders in other areas of GB seeking to address network generation constraints in assessing potential solutions. The solutions identified for the pathfinder area are applicable across GB, but feedback from stakeholders suggests there is not a one-size-fits-all solution, and that the local situation must be considered in the assessment.

The project did not receive funding for the second phase and so has now closed permanently.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

REGEN

Environmental Project Support

PROJECT BUDGET
SIF £101,373

START/END DATE
March 2024 – June 2024

WEBSITE
https://smarter.energynetworks.org/projects/10106218

PROJECT MANAGER
Ross Bibby

MAXFLEX

10106524

KEY ACTIVITIES

To maximise network flexibility, we need to understand the potential for flexibility from properties and the potential for connection to electricity network. Without this, network planning and flexibility procurement become costly – especially for local authority, industrial, and commercial (I&C) buildings. MaxFlex complements existing domestic flexibility work by introducing Energy Flexibility Certificates (EFCs) for I&C and public buildings. These certificates integrate network data, connection details, and market opportunities to reduce bills and improve network efficiency.

EXPECTED BENEFITS

MaxFlex produced a clearly defined visual comprising all the elements required to assess what the maximum flexibility is for an industrial and/or commercial building or area.

PROGRESS

MaxFlex successfully completed the Discovery phase, delivering an Energy Flexibility Certificate (EFC) framework to demonstrate the flexibility potential of properties. The project estimated a £97 million net benefit over 25 years and outlined the data and infrastructure requirements to support EFCs.

Due to limited public data for industrial and commercial (I&C) customers, physical assessments were identified as essential. The team also noted that ongoing reforms to Energy Performance Certificates (EPCs) could align with and support EFC development.

Two infrastructure hosting options were explored: a network-centric model and a publicly owned platform. EFC use cases were validated with stakeholders including DNOs/DSOs, local authorities, I&C customers, government, and innovation projects, all of whom expressed strong support and recognised the benefits.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

Baringa Brighter together

GREATER LONDON AUTHORITY

University of Reading

PROJECT BUDGET
SIF £137,102

START/END DATE
March 2024 – June 2024

WEBSITE
https://smarter.energynetworks.org/projects/10106524

PROJECT MANAGER
Simon O'Loughlin

NATURE4NETWORK

10128804

KEY ACTIVITIES

Energy networks rely on engineered solutions to address challenges like flooding, overheating, and visual impact. Nature4Networks explores the potential of Nature-based Solutions (NbS) as sustainable, resilient alternatives. NbS is widely used in sectors like coastal protection and urban greening but, its application to GB energy networks is untested and presents unique challenges. In the Discovery phase, the project scoped potential NbS for specific network assets, captured in the Nature4Networks Catalogue. In Alpha, the focus shifted to practicalities, constraints, third-party considerations, and detailed costings for implementation and maintenance.

EXPECTED BENEFITS

Nature-based Solutions (NbS) may offer greater value than traditional infrastructure, potentially reducing electricity bills. Environmentally, certain NbS can sequester carbon in biomass, contributing to negative emissions. The project will evaluate Scope 1–3 emissions and broader environmental impacts, including biodiversity. There is revenue potential from ecosystem services like carbon credits and landowner payments. Additional benefits include noise reduction, improved public acceptance, and lower rollout risks.

PROGRESS

The completed Discovery and Alpha phases tackled key barriers such as land ownership, regulatory frameworks, and investment appraisal. Through extensive stakeholder engagement, the project identified 14 Nature-based Solutions (NbS) to address common network challenges, developed engineering standards for four use cases, and established KPIs to assess NbS performance. The team proposed updates to Ofgem's cost-benefit analysis framework, reviewed relevant policy and regulation, and selected pilot sites for real-world testing.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

frontier economics

GHD

SP Energy Networks

PROJECT BUDGET

SIF Discovery: £148,247

SIF **Alpha:** £499,148

START/END DATE

March 2024 – June 2024

October 2024 – April 2025

WEBSITE

Discovery:
https://smarter.energynetworks.org/projects/10105122

Alpha:
https://smarter.energynetworks.org/projects/10128804

PROJECT MANAGER

Dot Revill

SeaChange

10124552

KEY ACTIVITIES

As ports move toward decarbonisation, conservative forecasts suggest a 30-fold increase in electricity demand, requiring electricity networks to plan proactively. SeaChange Alpha developed tools to help ports explore transition scenarios, engage with Distribution Network Operators (DNOs), and provide accurate data to support network planning. This aligns with the SIF Innovation challenge to enhance coordination, modelling, and planning through digital simulation and whole-system approaches.

EXPECTED BENEFITS

The project outlines both costs and benefits associated with implementing on-site renewables and energy storage to address grid shortfalls. Key costs include CAPEX/OPEX for technology deployment, resource mobilisation by ports and DNOs, and software design, implementation, and maintenance. In contrast, the benefits include reduced CO_2 emissions and energy costs, avoided investment in polluting infrastructure, and improved coordination and visibility of future energy needs. Additional advantages include avoided reinforcement costs and connection delays, enhanced investment transparency and timing, and stronger collaboration between DNOs and maritime stakeholders.

PROGRESS

The project has developed a Python-based NET Tool prototype to help ports simulate energy scenarios and engage effectively with DNOs, supporting better planning and coordination. Complementing this is the Living Port concept – a virtual model that assesses network impacts, headroom, and the ripple effects of port decarbonisation. Stakeholder engagement has been strong, with three well-attended workshops in London, Edinburgh, and online, drawing broad industry participation and ministerial recognition. As the project evolved, so did its understanding of key challenges: limited grid visibility into maritime demand, uncertainty in planning, varying resilience needs across stakeholders, the broader infrastructure impacts of ports, and the sector's diversity.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

University of Strathclyde PNDC; Ricardo; British Ports Association; EMEC The European Marine Energy Centre Ltd; ABP Associated British Ports; national gas transmission

PROJECT BUDGET
SIF Discovery: £149,431
SIF Alpha: £445,189

START/END DATE
March 2024 – May 2024
October 2024 – April 2025

WEBSITE
Discovery:
https://smarter.energynetworks.org/projects/seachange01
Alpha:
https://smarter.energynetworks.org/projects/10124552-2

PROJECT MANAGER
Gemma Ennis

RIDES (RURAL INDUSTRIAL DECARBONISATION SUPPORT) 10143030

KEY ACTIVITIES

As rural industries decarbonise, they may find this transition challenging. This is where Network operators can provide valuable support to help them make the right decisions. Rural networks are often characterised by radial circuits with limited capacity. These circuits are harder and more expensive to reinforce. RIDES will develop a tool to show rural industries their potential decarbonisation pathways. It will also help network companies to understand what their future investment needs will be, allowing efficient, coordinated investment by network companies and their customers. RIDES will smooth and accelerate the path to net zero for rural industry.

EXPECTED BENEFITS

More accurate and timely forecasts of future load on networks depend on a range of variables from economics, technology and societal trends, legislation and international markets. RIDES will reduce the uncertainty associated with the decarbonisation choices that industrial customers will make.

Accurate forecasting translates into driving benefits through:

- Informed deferment of capital investments
- Right sizing of reinforcements making "build once" a more realistic option
- Greater certainty of forecast use of flexibility services
- Longer deferment because of greater certainty

PROGRESS

RIDES successfully delivered all Discovery phase objectives. The project identified, mapped, and categorised 137 key industrial sites across northern Scotland, and engaged 26 individuals through in-depth interviews with 15 key stakeholders. It reviewed 18 relevant policy and regulatory papers, outlining a strategy to support safe progress. Eight major barriers to rural industrial decarbonisation were documented for future action, alongside the creation of five rural industrial archetypes and their associated challenges. A conceptual design of the RIDES tool was developed, with its core functionality defined. A cost-benefit analysis indicated that RIDES could unlock up to £470 million in benefits by enabling strategic network reinforcement.

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATORS

Guidehouse

ade
The Association for Decentralised Energy

PROJECT BUDGET
SIF £110,655

START/END DATE
February 2025 – May 2025

WEBSITE
https://smarter.energynetworks.org/projects/10143030

PROJECT MANAGER
Simon O'Loughlin

3DAR (DYNAMIC, DATA DRIVEN ASSET RATING)

10143133

KEY ACTIVITIES

With growing demand for electrification and renewables, many distribution networks are reaching capacity and need intervention. Traditional solutions like reinforcement or flexibility services are often costly and slow. This project offers a scalable, data-driven alternative by applying dynamic asset ratings (DAR) at the distribution level for the first time. Using real-time, local weather data and asset modelling, 3DAR optimises capacity, improves investment planning, cuts costs, and enables faster, more resilient connections. 3DAR will establish a common framework across asset types. By combining asset and demand forecasts with advanced weather data, it supports both long-term planning and near real-time network optimisation. Building on academic research, SSEN Transmission's REVISE Discovery Phase, and SPEN's P4R Beta Phase, 3DAR tackles the challenge of cost-effective, scalable deployment across DNO networks.

EXPECTED BENEFITS

3DAR offers a comprehensive, real-time view of network load and capacity, identifying where additional headroom can be unlocked and assets can safely exceed static limits. Building on SSEN's success in deferring over £44 million in ED2 using existing tools, 3DAR presents even greater potential for cost-effective investment deferral. By optimising capacity through dynamic ratings, it also reduces reliance on expensive flexibility services – potentially saving 5–15% of the projected £5.1–£6.5 million CAPEX under Consumer Transformation in RIIO ED2. Environmentally, 3DAR supports low-carbon grid operations by enhancing renewable integration and reducing fossil fuel use, directly cutting CO_2 emissions. Additionally, it enables the creation of new market processes through continuous evaluation, supporting efficient, scalable network management with fewer external interventions.

PROGRESS

Discovery finished.Alpha application to be submitted June 26, 2025

PRIMARY STRATEGIC OBJECTIVE

ACCELERATING PROGRESS TOWARDS A NET ZERO WORLD

COLLABORATOR

SIAPARTNERS

PROJECT BUDGET
SIF £108,352

START/END DATE
February 2025 – May 2025

WEBSITE
https://smarter.energynetworks.org/projects/10143133

PROJECT MANAGER
Cori Critchlow-Watton

I-LAD (INNOVATING LOSSES ANALYSIS AND DETECTION) 10143004

KEY ACTIVITIES

Electrical losses—both technical and non-technical – carry significant financial, environmental, and social costs, and are expected to rise with increased electrification, low-carbon technologies, and cost-of-living pressures. Current tools only provide estimates, making targeted loss reduction difficult. This project tackles the issue through four key activities: generating synthetic data to train machine learning models for detecting non-technical losses like energy theft; using AI, machine vision, and analytics to model losses in greater detail; developing GDPR-compliant data-sharing frameworks to overcome governance barriers; and creating automated systems for real-time loss monitoring. Losses currently cost households around £100 per year and account for nearly 90% of a DNO's greenhouse gas emissions. Electricity theft alone causes 2.2TWh in annual losses – including 0.75TWh from cannabis farms – posing safety risks and links to wider criminal activity. Addressing just 10% of this could save 75GWh, over £4 million, and 20,000 tonnes of CO_2 annually, making improved detection vital for both sustainability and public safety.

EXPECTED BENEFITS

1. Improved NTL detection despite limited real-world examples.
2. DNOs automatically identifying, modelling and recording losses.
3. Enhanced cross-sector cooperation and accountability.
4. An effective loss mitigation system that continuously monitors and reports losses.

PROGRESS

The Discovery Phase is progressing well, with several key milestones achieved. NTLs have been identified as the main focus due to their high improvement potential. Relevant data types for detecting NTLs have been analysed and documented, and various analytical and modelling techniques outlined. A wireframe for a future 'losses service' has been developed, based on principles of fairness, security, and accuracy. Stakeholder engagement is underway, with key partners – law enforcement, fire services, consumer groups, and local authorities – identified for the upcoming Alpha phase, pending funding.

PRIMARY STRATEGIC OBJECTIVE

PROVIDING A VALUED AND TRUSTED SERVICE FOR CUSTOMERS AND COMMUNITIES

COLLABORATORS

CGI, frontier economics, ScottishPower

PROJECT BUDGET
SIF £149,167

START/END DATE
February 2025 – May 2025

WEBSITE
https://smarter.energynetworks.org/projects/10143004

PROJECT MANAGER
Dot Revill

FASTTRACK

10142974

KEY ACTIVITIES

With the distribution queue nearing 180GW, DNOs urgently need scalable tools to accelerate connections and optimise existing capacity, critical for a flexible grid and Clean Power 2030 goals.

- **Challenge:** Safely integrate new connections while managing reinforcement and flexibility.
- **Gap:** DNOs lack tools to dynamically assess how the evolving queue impacts network assets.
- **Limitation:** Current manual planning methods are not scalable amid rising connection volumes and electrification.
- **Solution:** FastTrack uses AI to simulate the load impact of connection requests up to two years ahead – from primary substations to GSPs. It:
  - Aggregates the cumulative effect of connections.
  - Builds a probabilistic view of future load and likely dropouts.
  - Factors in capacity, topology, load, and external data (e.g. land ownership).

EXPECTED BENEFITS

Financially, FastTrack improves forecasting and enables risk-weighted investment, helping to avoid costly, unnecessary reinforcements. This reduces network operating costs and consumer bills. Environmentally, it supports earlier adoption of low-carbon technologies with lower CO_2 emissions, when compared with redundant infrastructure. FastTrack enhances application processing by combining queue data with third-party insights, such as housing trends.

PROGRESS

The Discovery phase clarified the problem by examining current practices, challenges, and user needs in investment planning. Existing load growth forecasting models (e.g. DFES), don't account for the cumulative impact of multiple requests, predict changes like dropouts, or provide real-time updates, and often lead to conservative plans and reactive rework. Discovery also highlighted the influence of external initiatives e.g. NESO's Connection Reform focuses on generation, while DNOs must also consider demand – FastTrack's focus. FastTrack is now seeking SIF Alpha funding to develop a user-tested wireframe prototype of the Probabilistic Load tool.

PRIMARY STRATEGIC OBJECTIVE

DELIVERING A SAFE, RESILIENT AND RESPONSIVE NETWORK

COLLABORATOR

FACULTY

PROJECT BUDGET
SIF £143,033

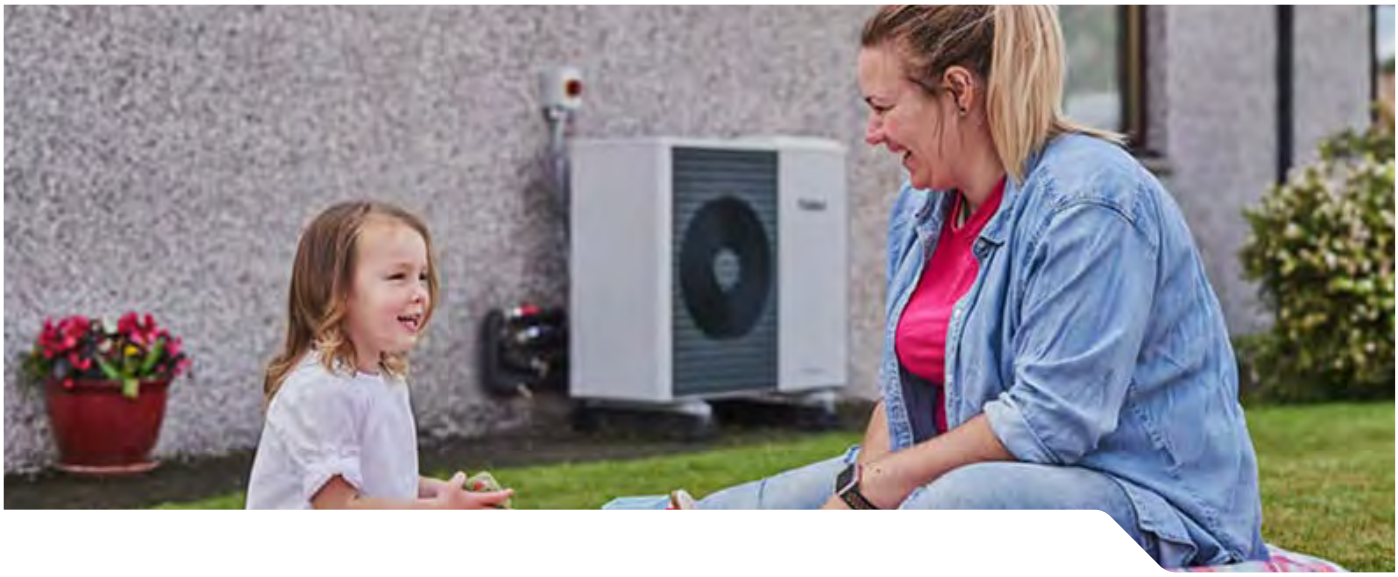
START/END DATE
February 2025 – May 2025

WEBSITE
https://smarter.energynetworks.org/projects/10142974

PROJECT MANAGER
Gemma Ennis

EQUAL LCT

10145484



KEY ACTIVITIES

EqualLCT Phase 2 will focus on two innovative areas:

- Determining the network impact and value, of an enduring peak demand reduction from EE and HPs. By valuing this long-term benefit (beyond a single price control) and sharing it with the LCT supply chain, the investment case for HPs would be more attractive and accelerate a roll out across a broader consumer base.
- Demonstrating the use case of enhancing existing digital tools like LENZA (which supports Local Authorities with LAEP development) to better share network data with the LCT/EE supply chain. We will overlay additional data on customer segmentation, housing stock and the long-term network value of permanent peak reduction (identified in 1). These new data sources would help energy suppliers and the LCT supply chain to more efficiently target their propositions.

EXPECTED BENEFITS

Based on the CBA that we constructed prior to the start of the project the benefits are forecast to be as follows:

- Savings from network reinforcement due to reduction of peak demand (c.£48m)
- Savings on customers' bills (c.£11m)
- Carbon savings (c.£0.38m)

These estimates will be refined at the project progresses.

PROGRESS

This project started at the end of February 2025 and no findings have yet been produced.

PRIMARY STRATEGIC OBJECTIVE

MAKING A POSITIVE IMPACT ON SOCIETY

COLLABORATORS

Baringa Brighter together

smsplc

PROJECT BUDGET
SIF £449,687

START/END DATE
February 2025 – August 2025

WEBSITE
https://smarter.energynetworks.org/projects/10145484

PROJECT MANAGER
Ross Bibby

SIF COLLABORATION PROJECTS LED BY OTHER LICENCEES

Below is a list of other SIF projects that SSEN is participating in. The projects are led by our collaboration partners; further details of those projects can be found via the listed project links or in the relevant annual reports from each Lead Party.

Project number	Project title	Lead party
10061710	Predict4Resilience (P4R) – Beta	SPEN-T SP Energy Networks Transmission
https://smarter.energynetworks.org/projects/10061710		
10079058-1	NIMBUS	SHE Transmission
https://smarter.energynetworks.org/projects/10079058-1		
10070764	CROWDFLEX	NGED – National Grid Electricity Distribution
https://smarter.energynetworks.org/projects/10070764		
10061356	TRINITY	UKPN – Eastern Power Networks Plc
https://smarter.energynetworks.org/projects/10061356		
npg_sif_013	MultiResilience Project – Enhancing Energy Network Resilience	NPg – Northern Powergrid (Northeast) Limited
https://smarter.energynetworks.org/projects/npg_sif_013		

FURTHER INFORMATION

The Innovation Strategy for SEPD and SHEPD can be found at the link below:

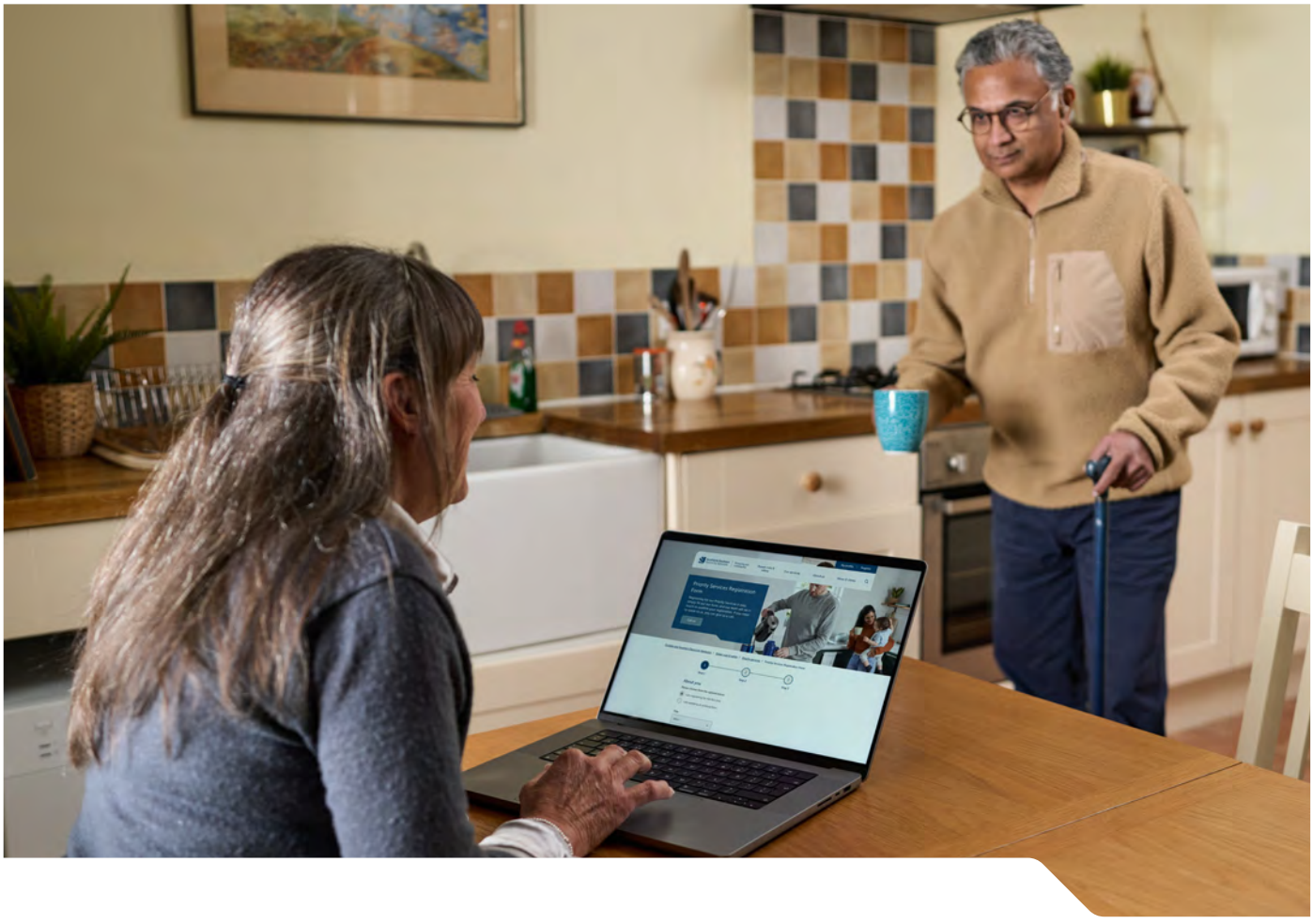
SSEN Distribution Innovation Strategy

https://ssen-innovation.co.uk/innovation-strategy/

Further details of all the NIA projects summarised above can be accessed through the following link:

ENA Smarter Networks Portal – SSEN Projects

https://smarter.energynetworks.org/energy-networks-innovation-strategy-2024/



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