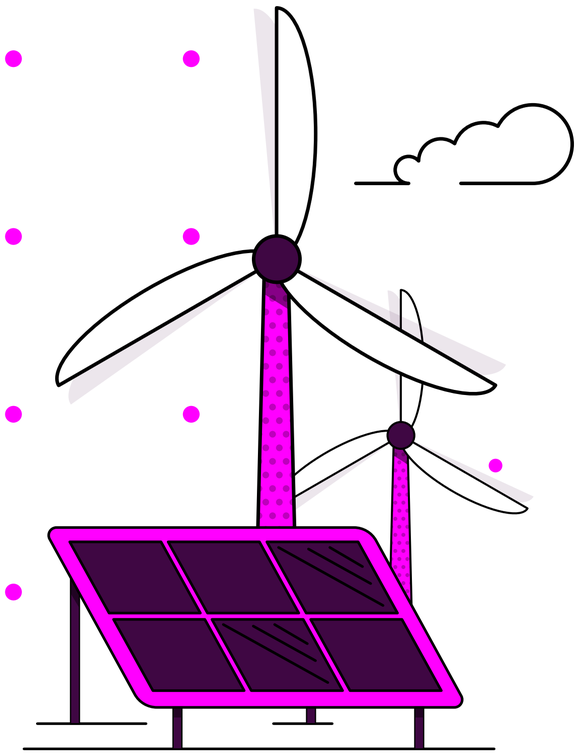
Innovation Annual Summary

2024/25

Public

NESO
National Energy System Operator



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Foreword

On the 1st of October 2024, we became the National Energy System Operator (NESO), an independent, public body responsible for planning Great Britain's (GB) electricity and gas networks. Additionally, we are tasked with operating the electricity system and creating insights and recommendations for the future whole energy system.

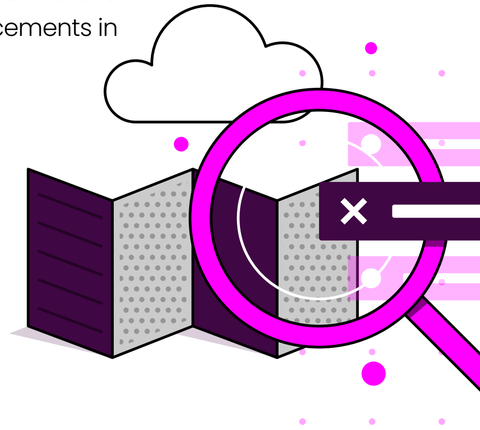
We play a key role in driving innovation within the energy sector, creating the environment to address energy challenges and develop innovative solutions, and ensuring others have space to do the same. During 2024/25, we refreshed our Innovation portfolio to reflect our transition to NESO, incorporating a new focus on whole-energy systems. We have established strong new partnerships with industry and academia, allowing us to drive innovation and take on a range of transformative projects, as well as expanding our understanding of how artificial intelligence (AI) can support our operations.

This year marks an exciting milestone, our Virtual Energy System: Data Sharing Infrastructure (DSI) Pilot is exploring how we can use DSI capabilities in facilitating scalable data sharing, leading to major benefits to the energy system, including improved operability and resilience, lower greenhouse gas emissions, and reduced consumer bills. We've also been deploying Innovation projects at pace. For instance, the REVEAL programme will arm NESO with the tools to partner with industry in uncovering novel technologies to support dynamic, flexible, and cost-effective grid balancing decisions. This innovation has delivered the Live Trial Environment and the Trial Management Platform, developing a suite of capabilities to transform how balancing trials are conducted, efficiently balancing the energy network.

We successfully ran 61 live projects through the Network Innovation Allowance (NIA) fund, an increase of seven compared to last year, along with 15 live Strategic Innovation Fund (SIF) projects. We are embarking on ambitious AI initiatives, such as the Volta programme, which aims to revolutionise the operation of our control room. The Grand Optimiser Design Philosophy is developing a suite of powerful optimisation tools and adaptive models to tackle emerging challenges, boost operational security, and minimise consumer costs.

Our flagship SIF projects, CrowdFlex and Powering Wales Renewably aim to integrate more renewable energy into the grid and make more informed decisions towards achieving net zero targets. Over the past year, our growing portfolio and achievements have shown just how crucial innovation is in driving a whole energy system that's affordable, reliable, and secure for everyone. We are excited about the future of innovation and the opportunities it brings. Together, we look forward to pioneering new solutions and achieving remarkable advancements in the sector.

Shubhi Rajnish
Chief Information Officer
National Energy System Operator



Portfolio Overview

Innovation is critical to helping us meet the challenges of transitioning to a zero-carbon future. We fund innovation ideas primarily through NIA and SIF, turning concepts into projects; for instance, Grid Connect X is launching a new grid connection simulation tool designed to accelerate the integration of renewable energy sources into the National Electricity Transmission System (NETS). This project demonstrates how our initiatives foster the development of innovative solutions and technologies.

As seen in Figure 1, we have spent a total of £24m in 2024/25, an increase of £13.1m from 2023/24. To address these challenges, we continue to effectively allocate the funding available to bring new and innovative ideas to life. Our portfolio has expanded to 76 live projects in 2024/25. This year, we have partnered on 61 NIA projects, seven more than last year. We have spent £15m in NIA initiatives, undertaking efforts in the zero-carbon transition, system stability, and digital transformation. We have explored energy endeavours ranging from heating flexibility to advanced weather data for power system modelling.

We're committed to collaborating with industry partners to generate new ideas and drive innovation. This year, we've participated in 15 SIF projects - 10 of them as a partner - with highly positive feedback from industry. With a spend of £9m in SIF initiatives, we've launched exciting new projects and advanced existing ones, such as our Network Security in a Quantum Future Innovation project. The increase in our Innovation demonstrates the continuous growth and maturity of our portfolio.

In April 2024, we created a new team within the Innovation department called the Innovation Incubator. This initiative was launched to further support the successful transfer of innovation project outcomes into business as usual (BAU). The team manages our portfolio of larger and more mature projects like CrowdFlex, Powering Wales Renewably, and the Volta programme. We work closely with business delivery teams to make sure there are robust plans in place to successfully implement these innovations, so that we may maximise their potential value.

Our year in numbers

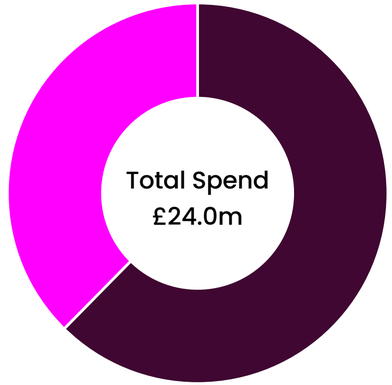
NIA Projects

61	29	32	29
Projects live in 2024/25	Projects registered	Projects continued from previous year	Projects completed

SIF Projects

02	04
Lead Discovery projects	Partner Discovery projects
01	02
Lead Alpha projects	Partner Alpha projects
02	04
Lead Beta projects	Partner Beta projects

Figure 1: Portfolio Spend in 2024/25



Project type	Funding
NIA **63%**	£15.0m
SIF **37%**	£9.0m

Innovation Scorecard

Our scorecard provides further insight on our activities from the past 12 months, highlighting the development of our portfolio, successes and areas for improvement.

Our Big Ideas Process

We received 83 Big Ideas in 2024/25, with 59 of these submitted by third parties. Over half of these ideas (57%) have been approved, reflecting our commitment to collaborating with industry.

To submit a 'Big Idea', please begin by visiting our website. There, you'll find a form with essential questions that help us understand your project and initiate the review process.

The idea is then checked against a set of criteria: alignment with the Innovation Strategy, duplication with existing projects, resource availability at NESO and funding eligibility.

We identify a dedicated Subject Matter Expert (SME) at NESO who would be best placed to review the idea, and if it is successful, will lead the idea into a project.

Projects are refined for a final pitch, then receive continuous support from the Innovation department into deployment.

Maturity of our portfolio

To measure how our portfolio has evolved, we've categorised our projects into core, adjacent, and transformational innovation.

Core innovation is all about researching potential new approaches and techniques, improving current processes, upgrading current technologies, or optimising activities we already have in place. This year, 28% of our projects fell into this category, highlighting our active efforts to constantly enhance our operations and technologies. One example is our Causational Analysis of Balancing Costs project, which unlocks deeper insights into balancing costs by exploring how novel factors dynamically interact with one another.

Adjacent innovation is about developing opportunities to support our existing capabilities through new tools, approaches and technologies, branching out into new areas that are related to NESO's current portfolio. These projects either complement what we're already doing or find new ways to use our existing capabilities. This year, 43% of our initiatives fell into this category and are already part of our expanded roles, reflecting our transition to NESO. FastPress is an example of adjacent innovation, exploring how AI can improve decision-making in National Transmission System (NTS) network planning.

Transformational innovation focuses on brand-new breakthrough technologies, processes, or business models that can significantly change and challenge the status quo. We've demonstrated strength and success, as 29% of our projects fit into this category. The Virtual Energy System: Data Sharing Infrastructure (DSI) Pilot is an example of transformational sector-first innovation, as it establishes initial DSI capabilities, facilitating scalable data sharing.

Innovation Scorecard

8.38/10
Average stakeholder and customer satisfaction score

83
Innovation ideas generated

59
External big ideas received

31
Big ideas developed into projects

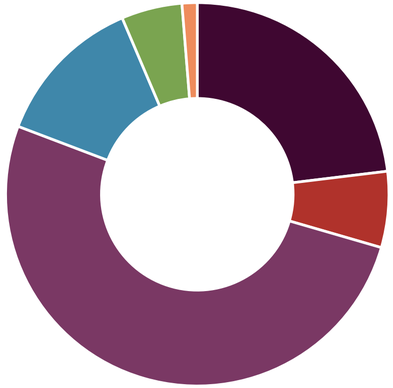
57%
Big ideas approved

33
days from submission to initial decision*

74
Project Partners

*Average length of time

Figure 2: Portfolio Overview by Energy Networks Association (ENA) Theme in 2024/25



- Data and digitalisation **23%**
- Flexibilty and market evolution **7%**
- Net zero and the energy system transistion **51%**
- Optimised assets and practices **13%**
- Whole energy systems **5%**
- Consumer vulnerability **1%**

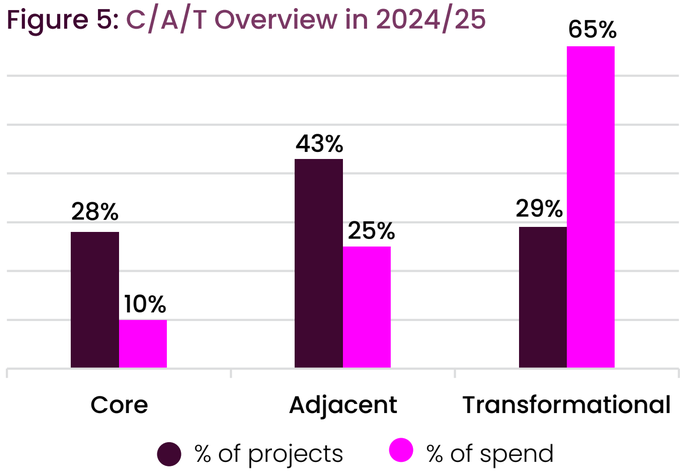
Figure 3: TRL Overview in 2024/25

	% of projects	% of spend
TRL 2	3%	0%
TRL 3	13%	6%
TRL 4	13%	6%
TRL 5	33%	19%
TRL 6	18%	47%
TRL 7	12%	9%
TRL 8	8%	13%

Figure 4: Partner Network in 2024/25

- Academia **16%**
- GB Networks **13%**
- Non-profit **4%**
- Private sector (small) **18%**
- Private sector (medium) **11%**
- Private sector (large) **27%**
- Public Body **11%**

Figure 5: C/A/T Overview in 2024/25



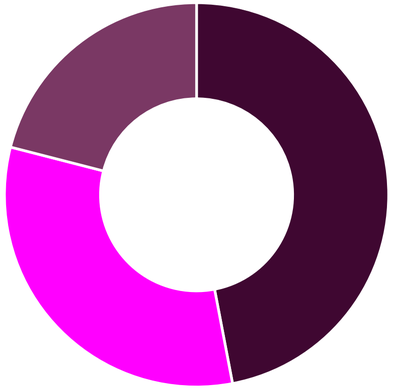
Innovation Scorecard

Figure 6 shows the split of research, development, and demonstration projects across our portfolio. These align to the Technology Readiness Level (TRL) framework, which measures a technology's maturity from concept to final product. Figure 3, on the previous page, shows that 47% of our spend is in TRL 6, which is due to £17.7m of SIF funding for CrowdFlex Beta. This year, almost half of our initiatives, (47%) were focused on research, with a spend of £12m, an increase of £5.2m from last year. Compatibility Assessment of Dispatch Options with GB Cross-border Markets is an exciting research project that explores how innovative cross-border trading arrangements can be developed or adapted to align seamlessly with novel market designs. As NESO, our remit has expanded to include responsibilities that are new to the energy system. We have utilised research funding to gain a better understanding of these new and developing areas, which will serve as a solid foundation for future Innovation.

32% of our portfolio consists of development projects, which aim to integrate existing technological knowledge and skills to create new processes or services. Our Neural BB project is an example of development, that harnesses the power of machine learning techniques to create a highly accurate model, revolutionising NESO's stability studies.

Demonstration projects make up 21%, with a spend of £10.3m, an increase of £7.8m. We partnered with the Welsh Government on our flagship project 'Powering Wales Renewably' which aims to create a digital twin of the Welsh energy system, and will be utilised by NESO, energy networks, and industry to make more informed decisions. Development and demonstration projects play a key role in building new tools and pathways needed to reach net zero. We're continually improving our ability to deploy initiatives efficiently and deliver benefits to both consumers and the energy system.

Figure 6: Split of spend by project type in 2024/25



Project type	Funding
Research **47%**	£12.0m
Development **32%**	£26.7m
Demonstration **21%**	£10.3m

Performance against our Innovation Strategy

To approve projects, we evaluate how effectively our Innovation projects align with the priorities set out in our Innovation Strategy.

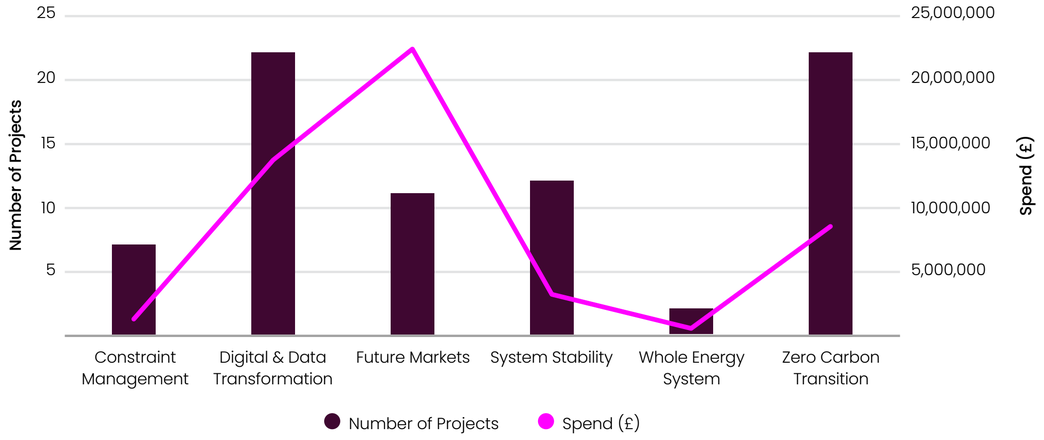
Figure 7 shows our performance against the 2024/25 innovation priorities, highlighting where we've focused our efforts over the past year. Notably, this year saw the highest number of projects dedicated to the zero-carbon transition and digital and data transformation priorities. We launched 22 projects under the zero-carbon transition, an increase of 18 from last year. This growth is evident in our commitment to zero-carbon operations, ensuring the electricity system remains operable as it decarbonises.

We have undertaken 22 projects focused on digital and data transformation, a significant increase of 14 projects compared to last year. Due to our role in the Interim Data Sharing Infrastructure Co-ordinator and because of our AI initiatives, we've experienced substantial growth in this priority area. Digital technologies are crucial, as Clean Power 2030 (CP30) pathways all require increased digitalisation.

Additionally, we had four more projects than last year aimed at managing constraints. This priority is about optimising transmission and distribution network capacity to handle peak system flows and finding the most cost-effective solutions for consumers. We're exploring novel methods to economically address limits on power transmission.

We've completed 12 projects focused on system stability, for the safe and secure operation of the electricity network. We've also delivered 11 projects in effective market design, which is vital for achieving zero-carbon goals and exploring long-term options. With our new whole systems perspective, we've initiated two projects aligned with the whole energy system priority and expect this to increase as our responsibilities grow.

Figure 7: Review of Portfolio against 2024/25 Innovation Strategy



Scaling Innovation

Here, we explore some of our past and current innovation projects and the progress made so far.

QWID Flexer

This project created a method to quantify future within-day flexibility needs, considering weather and consumer demand changes using historical and trial data. The metrics analysed supply and demand solutions for energy balancing. Since the completion of the project, the outputs of this model have contributed to the publication of flexibility requirements and insights in the Operability Strategy Report 2025 and Markets Roadmap 2025. Alongside these publications, the project will continue to support future work to understand system flexibility needs across all time horizons.

Find out more about this project on our website here.

Stability Market

Following the completion of the Stability Market Design Innovation project in 2023, we launched our first enduring stability market – the mid-term (Y-1) market, to procure inertia from existing assets. Since then, we have successfully awarded five contracts for inertia provision covering the period from October 2025 to September 2026. These contracts are expected to yield consumer savings of £47.3m and support GB's decarbonisation goals by providing inertia with zero- carbon intensity. Additionally, the second delivery year for this market has commenced, and we have recently introduced the long-term stability market, which seeks to secure additional zero-carbon inertia services.

Find out more about this project on our website here.

REVEAL

In Phase 4, the REVEAL team delivered the Proof of Concept (POC) for the REVEAL Live Trial Environment. This involved successfully replicating data exchanges with the control room by sharing Electronic Dispatch Logging (EDL), Electronic Data Transfer (EDT), and Operational Metering Data over a site-to-site Virtual Private Network (VPN). Phase 4.5 involves a 12-week work package to migrate the POC to the NESO tenant. Following this, REVEAL aims to deliver a backlog of capabilities to establish a robust Minimum Viable Product (MVP) with genuine trialling capabilities, enhancing accessibility for market participants.

Find out more about this project on our website here.

Scaling Innovation

Here, we explore some of our past and current innovation projects and the progress made so far.

DETECTS II

Following the conclusion of the DETECTS project in 2021, DETECTS II facilitated the development of a GB-level Electromagnetic Transient (EMT) network. By integrating User EMT models from the Southeast Coast area to investigate inverter stability issues, the DETECT II project successfully delivered a tool to assess grid stability. This initiative has enabled NESO to address practical challenges and complexities associated with EMT models. The tool is now utilised to evaluate the stability of the Southeast Coast grid under conditions with minimal or no fossil-fuelled generation, which is projected to become more prevalent from 2025 onwards. Additionally, the insights gathered from this project have contributed significantly to our current project, Neural BB. This ongoing project aims to develop non-black-boxed "surrogate" models using machine learning techniques to overcome the limitations inherent in black box models.

Find out more about this project on our website here.

Trial on Implementation of Wide Area Monitoring and Control System

The project successfully developed the Wide Area Monitoring and Control System (WAMCS) architecture to deliver frequency response services. It was the first initiative within the GB system to effectively demonstrate the WAMCS application for enhanced frequency control solutions. The outcomes of this project achieved the target latency necessary to trigger the required service responses, installed all components necessary for the trial, and established the essential communication links and firewall arrangements. Additionally, the insights gained from the project have informed future architectural requirements and the electroformed components needed for subsequent implementations. The project team also completed training on phasor data concentrator designs, which has enhanced NESO's capabilities in WAMCS system applications.

Find out more about this project on our website here.

Solar Nowcasting

This project employed deep learning techniques alongside satellite imagery and numerical weather prediction datasets to investigate the use of weather ensembles to enhance the accuracy and reliability of forecasts. The objective was to decrease carbon emissions and costs for end-users while enhancing the grid's capacity to process solar energy. The project outcomes demonstrated a 20% reduction in mean absolute error, a significant improvement in renewable forecasting. This can be attributed to multiple advancements in deep learning methodologies. By adopting these project outputs in system operations, NESO expect to improve forecasting models, reducing forecast error by about 50MW. With a wholesale price of £80/MWh, this could save £35m in one year and £175m over five years. Subsequently, these project insights will help produce more precise solar forecasts.

Find out more about this project on our website here.

Our Updated Strategic Priorities

Since becoming NESO, we have an even greater responsibility in helping Great Britain (GB) meet its net zero targets.

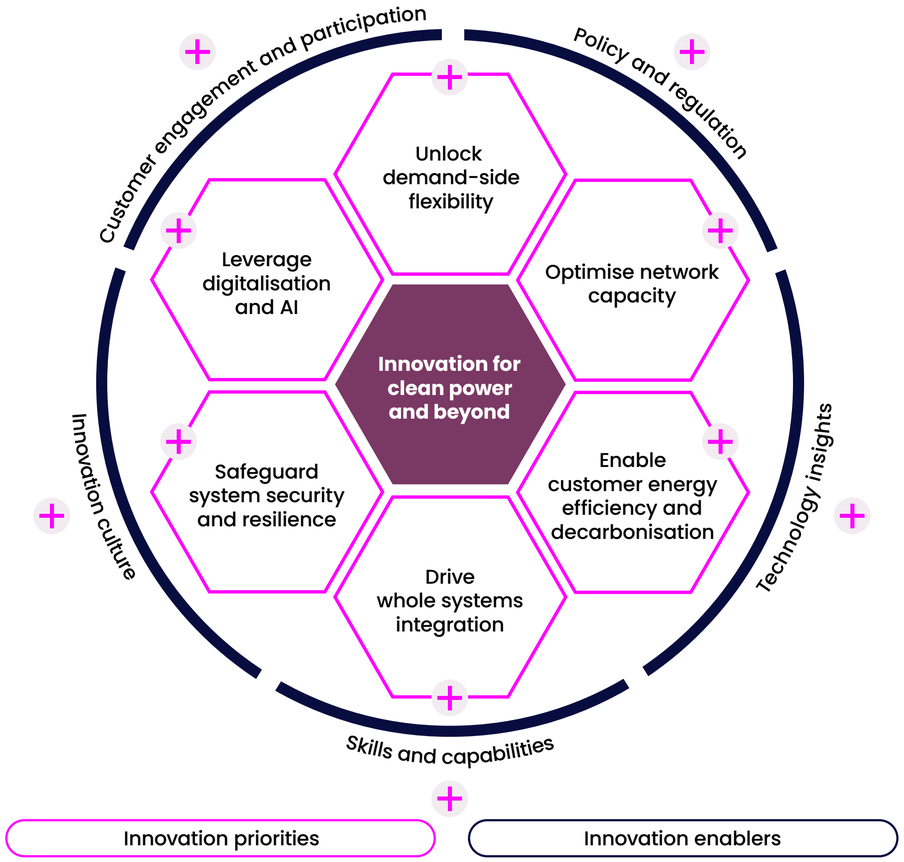
In December 2024, the government published the CP30 Action Plan. This set a clear course for the next five years, outlining the path to a stable, affordable and green electricity system by 2030.

It is a bold vision, but the scale and complexity of this challenge are unprecedented. This makes innovation critical.

Our 2025/2026 strategy outlines six key areas where innovation must be accelerated to achieve CP30. Looking beyond immediate goals, it also considers the steps needed today to prepare the whole energy system for achieving net zero by 2050. In doing so, it marks NESO's first Whole Systems Innovation Strategy.

The challenges ahead demand urgent, collective action. With our new duties, NESO is well-placed to facilitate innovation across the sector, driving GB towards CP30 and a net zero future.

Figure 8: Innovation for Clean Power by 2030



Case Studies

CrowdFlex

CrowdFlex will increase the integration of renewable energy into the grid, reduce balancing costs, and decrease the need for additional capacity or network reinforcement. This could potentially lower operating costs and reduce consumer bills.

Project overview

CrowdFlex is funded through Ofgem's strategic innovation fund (SIF) and is currently in its two-and-a-half-year Beta phase. CrowdFlex is playing a pivotal role in establishing domestic flexibility as a reliable grid management resource. The project has been conducting large-scale consumer trials and gathering data to develop models to more accurately forecast consumer flexibility. It is an industry-wide collaboration, bringing together expertise and innovation from across the sector, including OVO Energy, Ohme EV, distribution, energy industry partners and consultants. CrowdFlex not only helps consumers lower their energy bills but also aims to support GB's goal of achieving a net zero energy system.

Find out more about this project on our website here.

Results

CrowdFlex aims to enhance understanding of domestic flexibility's potential and technical capabilities, as well as consumer behaviours, to inform future market strategies. The first phase of summer trials took place in 2024, with OVO and Ohme EV's customers incentivised to use electricity flexibly, receiving utilisation payments for adjusting their energy usage (turn-up or turn-down) or availability payments for making assets like electric vehicles (EVs) available to the grid for automated control of when to charge. The winter trials took place from September 2024 to April 2025, with further trials scheduled for summer 2025.

Benefits

CrowdFlex aims to help NESO, Flexibility Service Providers, and Distribution System Operators (DSOs) better understand domestic customer behaviour and optimise the use of domestic flexibility for grid operations. The project aims to integrate more renewable energy into the grid, reduce balancing costs, and minimise the need for additional capacity or network reinforcement works, potentially lowering operating costs and consumer bills.

CrowdFlex

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I have a background in Forensic Science as a scientist and subsequently transitioned into the energy sector, where I led transformation projects across various industries and obtained a Master of Business Administration (MBA). Over a year ago, I joined NESO to lead the CrowdFlex project.

What do you enjoy about your role?

I appreciate the dynamic and unpredictable nature of each day. Not every day is straightforward, but my project team is exceptional, and we navigate uncertainties with a sense of humour and a shared perspective.

In a few words, what does innovation mean to you?

Innovation involves challenging the status quo, encouraging creativity, and inspiring new ways of thinking to drive progress and transformation.

> "We're excited to be in the Beta phase of the CrowdFlex project and collaborating with key industry partners on this large-scale programme."

Project Lead: Sanna Atherton

Job Title: CrowdFlex Project Lead

Directorate: Digital, Data & Technology

Partners: ovo energy, nationalgrid, Ohme, Scottish & Southern Electricity Networks, Centre for Net Zero Powered by Octopus Energy, aws, ERM

Compatibility Assessment of Dispatch Options with GB Cross-border Markets

The insights from this project will enable informed decision-making and efficient management of Great Britain's cross-border market.

Project overview

One of our primary strategic priorities is focused on designing markets that are suitable for the future. The Review of Electricity Market Arrangements (REMA) conducted by the Department of Energy Security and Net Zero (DESNZ), aims to identify the necessary reforms for transitioning to a decarbonised and secure electricity system in GB. This project is intended to qualitatively assess the impact of potential scheduling and dispatch reforms, as well as wholesale market locational granularity, on GB cross-border market arrangements from both the current perspective and potential future implementations. Following DESNZ's decision to implement the Reformed National Pricing Delivery Plan, we remain committed to aligning the wholesale market with the operational needs of the GB system, while recognising the pivotal role of cross-border markets as highlighted by this project's findings. This project is intended to qualitatively assess the impact of potential scheduling and dispatch reforms, as well as wholesale market locational granularity, on GB cross-border market arrangements from both the current perspective and potential future implementations.

Find out more about this project on our website here.

Results

In partnership with FTI consultants, we examined the current and future challenges in managing the GB cross-border market. Our internal and external engagements provided a substantial amount of new information, which we shared and evaluated with stakeholders to inform our final insights and analysis. With this enhanced understanding of managing the GB cross-border market, we communicated our findings to government stakeholders to further support and inform their work in REMA.

Benefits

The insights from this project will facilitate informed decision-making and effective management of the GB cross-border market. The project assessed how different cross-border trading arrangements could be developed or modified to align with various market designs. Additionally, it identified the advantages and disadvantages of these trading arrangements and explored potential future adaptations, providing valuable insights for REMA considerations.

Compatibility Assessment of Dispatch Options with GB Cross-border Markets

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I have a background in Electrical and Electronic Engineering, complemented by post-graduate studies in Financial Management and Sustainability, with 12 years of diverse experience in the energy sector, primarily in Colombia. In 2021, I moved to the UK to pursue an MSc in Sustainable Energy Futures at Imperial College, which sparked my passion for the GB energy sector. This led me to apply for an exciting role at NESO in Markets Development, and I was thrilled to join the Cross-border Strategy team in 2022.

What do you enjoy about your role?

I love the constant learning opportunities that working at NESO provides. For example, in my current role, I've had the chance to dive deep into cross-border markets, which were completely new to me at first. I'm thrilled to be actively involved in the ongoing market reform discussions, and the people at NESO have greatly contributed to my development, and I appreciate their support and collaboration.

In a few words, what does innovation mean to you?

Innovation is all about the ability to rethink and reimagine, whether it's a tool, a process, or an activity. This approach must be holistic and collaborative, ensuring that every perspective is considered. By working together and thinking outside the box, we can achieve meaningful improvements and drive progress.

> "This project is crucial for developing an efficient market that ensures clean, secure, and affordable electricity for GB."

Project Lead: Carlos Eduardo Vallejo Betancur

Job Title: Senior Development Lead

Directorate: Markets

Partners: FTI CONSULTING

Quantitative Assessment of Self and Central Scheduling

This project has offered crucial insights into the trade-offs between resolving transmission constraints at the day-ahead stage and allowing the market to manage energy imbalances closer to delivery, within both national and zonal frameworks.

Project overview

The current GB self-dispatch market design is based on bilateral trading between generators and buyers, who are incentivised to produce or consume in line with their contracted positions. NESO acts as a 'residual balancer', taking actions via the Balancing Mechanism (BM) to stabilise supply and demand and ensure system security. The BM has been observed to be functioning in a manner similar to a central dispatch market at times, but without the proper frameworks in place. As part of REMA, DESNZ are assessing the suitability of the current arrangements, or whether there is a case for central dispatch. This project aimed to provide a qualitative overview of different scheduling approaches and quantitatively estimate the impact of 'self' vs 'central' scheduling under national and zonal pricing. This work was intended to complement DESNZ's broader analysis and deepen the evidence base.

Find out more about this project on our website here.

Results

This project built on a previous study that examined the pros and cons of coordinated procurement of energy, response, and reserve across various market designs. It aimed to complement that study by directly evaluating the impacts of transitioning from self-dispatch to central dispatch. The analysis provided a quantitative estimate of the benefits to consumers and the system from different scheduling approaches. Additionally, it explored whether enhancements to the BM or zonal pricing could support the case for increased central scheduling.

Benefits

Central scheduling could offer consumer and system benefits by managing thermal constraints more efficiently, better utilising energy-limited assets like batteries, and enabling the co-optimisation of energy and ancillary services markets. This project has provided essential insights into the trade-offs between resolving transmission constraints at the day-ahead stage versus allowing the market to address energy imbalances closer to delivery, within both national and zonal designs. This analysis has led to a thorough understanding of the potential benefits and risks for consumers and the system, supporting decision-making for major reform options in REMA.

Quantitative Assessment of Self and Central Scheduling

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

After completing my studies in Economics, I joined NESO in 2022, formerly 'National Grid ESO,' on the graduate development scheme. I participated in three 6-month placements across different areas of the business, including Co-optimised Ancillary Service Procurement design, Public Affairs and Policy, and long-term Market Strategy. Currently, I am working on REMA with a focus on dispatch and balancing arrangements.

What do you enjoy about your role?

I really enjoy the breadth of my current role, as it combines detailed, technical understanding of dispatch arrangements with the need to think long-term about the impacts of decarbonisation on the electricity market design. This work is underpinned by a strong foundation in economic logic and fundamentals. I am grateful to work in an area where I can pursue my interests while positively impacting consumers and contributing to GB's decarbonisation efforts.

In a few words, what does innovation mean to you?

In essence, innovation is a continuous process of asking how we can make things better. Innovation does not necessarily need to be a 'big bang', as lots of small improvements at the edge add up to a significant change over time.

> "Working with the project partner has taught me about economic modelling and the role it plays in driving decarbonisation policy reform."

Project Lead: Danny Taylor

Job Title: Market Development Analyst

Directorate: Markets

Partners: FTI CONSULTING

FastPress

FastPress has demonstrated the capability to autonomously manage daily operational scenarios efficiently, allowing analysts to focus on complex future gas network planning decisions.

Project overview

Our portfolio has expanded this year to include our new whole systems capability, enabling FastPress to explore the application of AI in enhancing National Transmission System (NTS) network planning decisions. As part of our transformative AI initiatives and inaugural whole systems project, FastPress developed AI-based software that allows analysts at NESO to efficiently evaluate static day-to-day NTS offtake scenarios. This tool aims to resolve most standard cases, thereby enabling NESO to prioritise complex network configurations and potentially streamline time-consuming analysis, which is currently conducted manually. As we advance towards a net zero future, FastPress is instrumental in enhancing planning capabilities, particularly in relation to the increasing role of hydrogen and the assessment of future NTS methane requirements.

Find out more about this project on our website here.

Results

The software tool was designed to enhance decision-making regarding the NTS and allow gas network analysts to allocate more time to other components of their analysis, thereby improving productivity. The tool solves base scenarios and provides a starting point for analysts, reducing the frequency of repetitive tasks. Additionally, the pipeline recommender assists analysts in determining which pipelines to isolate for specific projects, such as a hydrogen backbone. The project is currently advancing to the Alpha+ phase, where the proof of concept will be further developed into a concrete application for analysts to gradually incorporate into their work.

Benefits

The project has uncovered the ability to efficiently resolve daily operational scenarios autonomously, which has enabled analysts to concentrate on complex future gas network planning decisions instead. This has significantly reduced the manual effort required to run static scenarios each day, with the anticipated solution saving multiple hours per analyst daily. Additionally, it has allowed the rapid assessment of the feasibility of future NTS methane capability requirements and facilitated the reconfiguration of the NTS as the importance of hydrogen increases.

FastPress

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I started my career as an Automotive and Manufacturing Engineer whilst studying for a Master's in Leadership and Management. I had the opportunity to become a Gas Analyst in 2022 and joined NESO in March 2024.

What do you enjoy about your role?

The primary reason for joining NESO was the company's culture and its values. Regarding the role, I find satisfaction in addressing intricate gas analysis scenarios and leveraging these results within the broader scope of a project.

In a few words, what does innovation mean to you?

Innovation to me means a product or a service that adds value to the end user. It's important that the project is implemented correctly and used by its customer/consumer.

> "Ideas that we did not think would even be possible are slowly starting to come to fruition and it's been great to see everyone working together to achieve it."

Project Lead: Sam Spinnael

Job Title: Gas Network Analyst

Directorate: Strategic Energy Planning

Partners: FACULTY

Volta

The Volta programme aims to show how AI-driven insights and automation can improve decision-making, optimise real-time operations, tackle future energy system challenges, and lower costs.

Project overview

As energy systems undergo unprecedented changes, it is essential to apply radical systems-level thinking for adaptation. The Volta programme includes several projects focused on innovation and the transformative applications of AI in the control room. Two key projects, including 'Real Time Predictor' (RTP), investigate methods to provide accurate real-time predictions to the control room through advanced analytics and machine learning algorithms. Another Volta project, known as the 'Grand Optimiser', aims to enhance dispatch optimisation tools and processes by developing integrated digital models. Additionally, the recently completed Volta Prototype illustrates the transformative capabilities that AI can offer to the operational environment.

Find out more about this project on our website here.

Results

Volta anticipates that AI will take a more active role in assisting control room operators by generating and suggesting different scenarios. As the energy transition is accelerating rapidly, and current methods rely heavily on historical data, these approaches will not offer the needed insight and decision support for the control room in the future. RTP will develop advanced algorithms and data analysis methods to assess outcomes and learning, which will support the continuous delivery of NESO projects. This project will aid NESO in its operational decision-making process as the complexity of managing a net zero carbon network rises. This capability can significantly enhance decision-making processes and operational efficiency.

Benefits

The Volta programme aims to demonstrate the potential of AI-driven insights and automation in enhancing decision-making processes, optimising real-time operations, addressing future energy system challenges, and reducing costs. Through RTP, we anticipate improvements in operational reliability, frequency and stability maintenance, optimal dispatch, and reduced balancing costs. The estimated reduction in balancing costs is approximately £43m, based on an average cost of £100MWh, assuming the new tool can achieve a 50MW reduction in real-time error, thereby leading to fewer real-time balancing actions.

Volta

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I have spent over a decade working in the energy sector, gaining experience in both industry and academia. I worked at Tallinn University of Technology in Estonia as a Senior Researcher and Project Manager. During my time there, I led international projects focusing on smart grids, system stability, and energy innovation. I hold a PhD in future power systems and completed a postdoctoral fellowship in future energy systems.

What do you enjoy about your role?

Currently, I am collaborating with leading experts and organisations to develop the future control room for GB's electricity system—an ambitious vision driven by AI that will transform grid operations. This initiative presents an exceptional opportunity to be at the forefront of innovation, shaping the next era of energy management.

In a few words, what does innovation mean to you?

Challenging the status quo to create real, forward-looking change, and bridging vision with action to shape a smarter, more sustainable energy future.

> "Volta is about reimagining how we manage complexity. Through using AI, and bold ideas to transform the control room from a traditional operation centre, we will create an intelligent, proactive system that drives a resilient energy future."

Project Lead: Roya Ahmadi

Job Title: Programme Manager

Directorate: Digital, Data & Technology

Partners: Mesh-AI, AFRY, IBM, University of Oxford, Imperial College London, Google, Smith Institute, FACULTY, University of Strathclyde Glasgow, FTI Consulting, N-SIDE, Tapestry, EY

Causational Analysis of Balancing Costs

This project identified various factors that enhance our balancing cost strategy by allowing us to prioritise actions that most significantly impact these costs and provided clarity for decision-making in our control room.

Project overview

One of NESO's primary duties is to balance the grid by ensuring supply meets demand every second of every day, while managing the network's physical constraints. Balancing costs have been increasing over the past three years and are projected to continue rising through to 2030. It is necessary to enhance control room decisions, identify system conditions that lead to higher-cost outcomes, and ensure our balancing cost reduction strategy is suitable. This project aims to develop a method to quantify the probability of certain conditions leading to high balancing costs, followed by a more detailed causal and statistical analysis of the most impactful factors identified.

Find out more about this project on our website here.

Results

We currently have a qualitative understanding of how certain phenomena affect balancing costs. For example, it is recognised that more frequent outages result in higher costs. However, there is currently a lack of quantitative data on how much these phenomena impact balancing costs. For example, the exact impact of increased wind on these costs is not well understood. This project aims to quantify how these exceptions impact balancing costs by analysing how certain conditions influence wholesale prices. This analysis will help develop insights into balancing costs, and by the end of the project, the aim is to develop a tool capable of assessing current conditions and predicting whether they will result in a high-cost day.

Benefits

This project will help NESO gain a deeper understanding of how specific circumstances will impact balancing costs. For example, reducing the impact of interconnector swings during a single interval could result in significant savings in balancing costs. Identifying a range of factors like this will also contribute to our balancing cost strategy, enabling prioritisation of actions that have the greatest impact on these costs and providing clarity for our control room's decision-making process.

Causational Analysis of Balancing Costs

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I began my career as a Geologist and Mining Consultant in Australia, after completing my studies at Melbourne University. Following a few years working in gold mines, I transitioned into the energy industry with the Australian Energy Market Operator (AEMO), where I was part of their markets teams. Three years ago, my wife and I relocated to the United Kingdom, and after a brief period in consulting, I joined the Balancing Costs team two years ago.

What do you enjoy about your role?

At NESO, I deeply appreciate the sense of purpose we maintain, particularly within the Balancing Costs team. Our goal of improving balancing costs is one that instils a high level of confidence and serves as a significant motivator. The team comprises highly skilled analysts and data scientists, and our collaborative environment continually fosters mutual learning and growth.

In a few words, what does innovation mean to you?

In a continuously evolving energy system, we encounter unprecedented challenges. Innovation enables us to adapt effectively to these challenges. Although our objectives remain unchanged, the conditions under which we operate have transformed. Therefore, we must adjust our strategies to successfully meet these objectives.

> "This project will develop our understanding in balancing costs and describe the landscape of how these complicated factors influence one another."

Project Lead: David James Dixon

Job Title: Balancing Cost Manager

Directorate: System Operations

Partners: Imperial College London Consultants

Network Security in a Quantum Future

The tool created by this project will help identify threats proactively by evaluating systems, protocols, and data assets to find vulnerabilities that could be targeted by quantum attacks.

Project overview

As part of the UK's critical national infrastructure, the energy system must be secure against malicious cyberattacks. Emerging quantum computing technologies could help hackers break encryption that is currently highly secure, threatening the resilience of energy systems. As NESO, we provide whole system coordination and analysis for system resilience and preparation for emergencies across the GB energy industry. This project addresses the threat of cyberattacks, by creating an innovative risk management tool to assess the quantum threat to the energy network, mapping it to a diverse range of energy system assets, and enabling prioritisation of appropriate mitigations.

Find out more about this project on our website here.

Results

This project is currently in the Alpha phase and aims to produce a prototype tool that will provide information on quantum threats and mitigations for energy system security teams. The tool will facilitate timely system security without requiring expert knowledge of quantum mechanics. Feedback has been gathered to develop and refine the tool, balancing the evaluation and risk process to make better-informed decisions and manage risks from quantum threats.

Benefits

The tool developed by this project will facilitate proactive threat identification by assessing systems, protocols, and data assets to pinpoint vulnerabilities susceptible to quantum attacks. This analysis will offer insights into which systems are at risk, based on the maturity level of quantum computers, thereby informing decision-making processes. The broader advantage of this tool lies in its capability to protect critical infrastructure, such as energy grids and Supervisory Control and Data Acquisition (SCADA) systems, as well as safeguard sensitive data, including energy production methods, models, and codes. Furthermore, it will recommend quantum-safe measures. The benefits provided by this tool will ensure that mitigations can be deployed cost-effectively, maximising value for money for the consumer.

Network Security in a Quantum Future

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I am a Cyber & Information Security professional with 12 years of experience in security, networks, compliance, and management, and I joined NESO in May 2024. My previous experience includes roles in financial services and telecommunications, focusing on design, operations, risk, and control. I am a full member of the Chartered Institute of Information Security (MCIIS) and a Principal Cyber Security Professional of the UK Cyber Security Council (PCSP).

What do you enjoy about your role?

I am highly engaged by the continual evolution of the cybersecurity field, as cyber threats are perpetually changing, which ensures that my work remains stimulating. There is consistently something new to learn, whether it involves emerging attack vectors, evolving compliance standards, or innovative technologies designed to strengthen defences.

In a few words, what does innovation mean to you?

Innovation in cyber security involves proactively shaping the future of security, rather than merely responding to threats. It encompasses the ability to foresee evolving risks and devise creative, effective solutions that not only protect against attacks but also empower organisations to grow confidently.

> "Innovation involves rethinking processes to manage risks more intelligently. It transforms security into an advantage, allowing organisations to adopt new technologies, explore new markets, and build trust."

Project Lead: Konstantinos Polychroniadis

Job Title: Lead Security Consultant

Directorate: Digital, Data & Technology

Partners: cambridge consultants, THE UNIVERSITY of EDINBURGH

Virtual Energy System: Data Sharing Infrastructure Pilot

This project is exploring how we can use DSI capabilities in facilitating scalable data sharing, leading to major benefits to the energy system, including improved operability and resilience, lower greenhouse gas emissions, and reduced consumer bills.

Project overview

Digitalisation and data sharing are essential components for achieving net zero. This initiative developed a Pilot for the Data Sharing Infrastructure (DSI) by integrating expertise from NESO, project partners, and the National Digital Twin Programme, with close support from Ofgem. The project established initial DSI capabilities and illustrated its potential in facilitating scalable data sharing through an outage planning use case scenario. This pilot represents a significant step towards realising the broader objective of the Virtual Energy System (VirtualES) in delivering a digitalised, secure, and efficient energy system. The Pilot has utilised knowledge gained from previous project stages to develop and demonstrate the required technology.

Find out more about this project on our website here.

Results

The DSI Pilot project has successfully met its goals, setting the programme up for success as it moves forward into the Minimum Viable Product (MVP) stage. The design and development phase of the Pilot has provided a proof of concept (PoC) for the DSI, allowing for complete testing of the technical user journey with network partners. This PoC has provided crucial insights for the development of the DSI's conceptual model, helping to reduce risks in future development. The results from the Pilot will guide future development to focus on scaling up, both in terms of the number of participating organisations and the variety of available data products. Additionally, the results have provided valuable learning on the social aspects of implementing the DSI across the energy system, including, legal, skills and capabilities and regulatory requirements.

Benefits

By collaborating directly with network partners, the DSI Pilot has gathered valuable user feedback. This information can be used in future phases to better understand needs and prioritise which features to develop. This includes gaining a deeper insight into the different implementation models needed to maximise adoption, tailored to each organisation's architectural preferences and capabilities. The implementation of the DSI Pilot solution has offered valuable insights into future requirements for achieving scalable, secure, and reliable data sharing. The Pilot and its related use cases are expected to bring major benefits to the energy system, including improved operability and resilience, lower greenhouse gas emissions, and reduced consumer bills.

Virtual Energy System: Data Sharing Infrastructure Pilot

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I have been part of NESO and our predecessors for 12 years, having joined the graduate programme after completing an Electrical and Electronics engineering degree. In the time since, I have had roles in power system engineering, power system modelling, data science, and innovation.

What do you enjoy about your role?

There are few industries whereby reducing carbon intensity we can reduce the emissions of other industries, businesses and homes across the whole country. The rapid pace of change in energy presents lots of opportunities to apply new technologies and approaches to solving problems.

In a few words, what does innovation mean to you?

Innovation is fundamental to achieving the energy transition, including finding, developing, and evaluating ideas to operate a system from zero-carbon sources and deliver the needs of customers.

> "The Data Sharing Infrastructure Pilot has turned research and design into a functional demonstration, revealing insights for scalable, secure, and reliable data sharing."

Project Lead: Jonathan Barcroft

Job Title: VirtualES Common Framework Manager

Directorate: Digital, Data & Technology

Partners: Mesh-AI ARUP

Powering Wales Renewably

The project aims to lower consumer energy bills, increase CO2 savings with more renewable generation, reduce future network operation costs, and offer annual savings for network service users by enhancing capacity use.

Project overview

One of our new roles as NESO involves establishing a strategic long-term approach to planning, identifying whole energy system needs, and ensuring that the system can be designed and constructed accordingly. Our SIF project, Powering Wales Renewably (PWR), unites the Welsh Government, whole energy system users, and network operators. The Beta stage of the project commenced in January 2025, and we are working together to identify the key priorities needed to support the implementation of the Welsh Government's decarbonisation plans, prepare for a net zero power system, and deliver net benefits to Wales's citizens and communities. By delivering a digital twin of the entire Welsh energy transmission and distribution systems, including electricity and gas transmission and distribution networks, PWR will provide a digital common interface to accelerate the integration of renewable generation, enhancing locational visibility of system challenges.

Find out more about this project on our website here.

Results

The project aims to create a digital twin of the Welsh energy system, which will be utilised by NESO, the networks, and other stakeholders to make more informed decisions and assist in achieving net zero targets more efficiently. The Beta stage of the project has commenced, and the project duration is four years. Significant changes are anticipated regarding digitalisation and data sharing across the industry during this period. This will require ongoing updates and involvement in various activities to maximise benefits for stakeholders.

Benefits

The project is designed to deliver a range of qualitative and quantitative benefits, including cost savings on energy bills for consumers and enhanced CO2 savings through increased renewable generation. It also aims to achieve future reductions in the cost of operating the network by reducing flexibility costs and avoiding curtailment, as well as annual cost savings for users of network services through improved network capacity utilisation. Furthermore, the project supports the achievement of Wales's 2035 electricity decarbonisation targets and provides societal benefits through economic growth associated with the PWR renewables uplift. Additionally, it helps reduce customer energy bills by lowering Transmission Network Use of System (TNUoS) charges through Local Supply.

Powering Wales Renewably

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

Following my studies in Chemical Engineering, a series of unforeseen events led me to the renewable energy industry, where I worked on hydrogen and smart grid innovation projects in Orkney. After three rewarding years on a small island in the North Sea, I relocated to Bristol and joined SSE. Prior to my tenure at NESO, I was involved with a renewable developer, focusing on wind farm development.

What do you enjoy about your role?

The PWR Project Lead role at NESO appealed to me as it provides a unique opportunity to integrate my previous experiences into a single, impactful project. Although I am new to the role, I have been thoroughly impressed by the team's extensive knowledge and their willingness to offer support.

In a few words, what does innovation mean to you?

Innovation involves challenging the status quo, which is often complex and not straightforward. However, these challenges lead to impactful insights that drive change.

"We're excited to begin the Beta phase of this collaborative Innovation project with the Welsh Government and industry partners, which aims to advance data sharing between energy organisations to enable more renewable energy on the grid."

Project Lead: **Megan McNeill**

Job Title: **Innovation Delivery Manager**

Directorate: **Digital, Data & Technology**

Partners: nationalgrid, Llywodraeth Cymru Welsh Government, CENIN, SP ENERGY NETWORKS, national gas transmission, WALES&WEST UTILITIES, CGI

Neural BB

This project will speed up electromagnetic transient (EMT) studies by avoiding compatibility issues, accurately representing distributed generation, and simplifying complexity, allowing for more frequent use of detailed models.

Project overview

In our ongoing efforts to establish a decarbonised, efficient, and secure energy system, the variety of generator types supplying our power will expand. Among these, Inverter-Based Resources (IBRs) will be predominant. IBRs are generators connected through converters, rather than synchronous spinning turbines, such as battery energy systems, wind, and solar generators. Our current modelling of the energy system does reflect both synchronous generators and IBRs; however, this approach may become inadequate for rapid transient behaviours—momentary changes in power supply—that are prevalent in networks dominated by IBRs. These require more complex and slower electromagnetic transient (EMT) analysis. This project aims to employ machine learning techniques to develop faster EMT models with sufficient accuracy for use by NESO in stability studies.

Find out more about this project on our website here.

Results

This project will use machine learning to develop a sufficiently precise model for future stability studies. Accurate and fast EMT simulation could lower costs by improving the identification of potential issues, representing various generation types accurately, reducing complexity and enabling more frequent use of detailed models. A neural model of a generator for dynamic EMT studies will be developed, along with a methodology for creating efficient black-box models for dynamic performance EMT studies.

Benefits

The successful execution of the project will facilitate faster EMT studies, including the avoidance of compatibility issues, accurate representation of distributed generation, and the reduction of complexity to enable detailed models to be used more frequently. This project is expected to decrease the required safety margins, which might result in savings, especially across system boundaries that could be constrained on the network. Converter-stability limited boundaries are expected to become more prevalent as sources such as wind, solar, batteries, and high voltage direct current (HVDC) grow in dominance.

Neural BB

Innovation culture

Can you tell us about your previous career and education background, and how you came to join NESO?

I hold a BSc in Electronic Engineering and Control and completed a year of internships and teaching before pursuing an MSc in Electrical Engineering and Renewable Energy Systems. I previously worked as a Lead Assistant Researcher, then joined NESO through the Graduate Scheme, working in Offshore Coordination, National Grid Electricity Transmission's Net Zero Innovation, and later at NESO for Operability products. I am currently employed in Operability Innovation.

What do you enjoy about your role?

The variety of problems to solve is significant. We focus on ad-hoc analysis that deviates from routine tasks, offering opportunities to address new issues and grow regardless of your experience level. Additionally, Innovation projects provide exposure to different fields such as Computer Engineering and Applied Mathematics. By delivering these projects or collaborating with our suppliers, you gain distinct experience and insights.

In a few words, what does innovation mean to you?

Innovation is about building the right solution at the right intersection of disciplines. It's all about connecting the right principles together to give you a solution or just a better way of doing things.

> "Neural networks are a flexible and powerful technology; it would be a great achievement to leverage these strengths to offset the computational load of electromagnetic transient simulation."

Project Lead: Khalid K.A Mohamed

Job Title: Senior Engineer

Directorate: Engineering and Customer Solutions

Partners: tx transmission excellence ltd

Delivering Value through Collaboration

Our distinctive role in facilitating innovation throughout the energy system is delivered by industry-wide collaboration. We teamed up with 74 different project partners across a diverse group of organisations, helping us tap into a wide range of perspectives and expertise, which is crucial for developing innovative solutions. We've been able to grow our network and explore new opportunities for growth and development. This year, 16% of our partners were academia, up 9% from last year. By collaborating with a diverse range of organisations, from academia to technology start-ups, we gain access to cutting-edge knowledge and research across a broad range of fields. This helps to ensure project ideas are truly innovative.

Figure 4: Partner Network in 2024/25

- Academia **16%**
- GB Networks **13%**
- Non-profit **4%**
- Private sector (small) **18%**
- Private sector (medium) **11%**
- Private sector (large) **27%**
- Public Body **11%**

74
Project Partners

Delivering Value through Collaboration

No.10 Data Science team Hackathon

NESO participated in a Hackathon organised by No.10 Downing Street. The three-day event, conducted in partnership with the No.10 Data Science team, NESO, and Kaluza, involved 72 participants who worked on investigating complex decarbonisation challenges and developing innovative prototype solutions within a short timeframe. Over the course of the intensive event, participants prototyped and developed solutions that could typically require months, demonstrating NESO's increased capability for innovation across industry and collaboration.

Global engagement

This year we welcomed stakeholders from Japan and Singapore to our control room to discuss our shared efforts in grid decarbonisation through innovation. We also hosted representatives from Tokyo Electric Power Company (TEPCO), Japan's largest Transmission System Operator (TSO), and the Mitsubishi Research Institute. During the various visits, we focused on our strategies for achieving carbon neutrality, emphasising grid operation and the importance of technological advancements. We also shared novel GB learning and approaches to successful innovation. NESO is committed to global engagement, as it facilitates the exchange of knowledge and methodologies for successful innovations, enabling us to address common challenges and gain a comprehensive understanding of future advancements.

Get in Touch

Visit our website or contact us to learn more about NESO's innovation process, our strategic priorities and the funding streams available.

Contact the team:
innovation@neso.energy

Media enquiries:
press.office@neso.energy

Our website:
Innovation | National Energy System Operator

Write to us at:

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Bearwood Road
Sindlesham
Nr Wokingham
Berkshire, RG41 5BN

Appendix A – Live Projects in 2024/25

Ref Number	Title	Status	Partner(s)
NIA2_NGESO071	AI Centre of Excellence – GB Industry Data Science Fellowship Scheme	Complete	Ove Arup And Partners Ltd
NIA2_NGESO057	Alternative Metering (Baselining)	Complete	The Smith Institute
NIA2_NGESO018	Automated SSO Identification	Complete	TNEI Services Ltd
NIA2_NGESO076	Battery Storage Modelling for Enhanced Connection Assessment (BaTSeC)	Complete	Frazer-Nash Consultancy Ltd
NIA2_NGESO069	Carbon Tracking and the ESO (The Implications for National Grid ESO of 24/7 Carbon Free Energy Trading)	Complete	Afry
NIA2_NGESO094	Compatibility assessment of dispatch options with GB cross-border markets	Complete	FTI
NIA2_NGESO033	Co-optimisation of Energy and Frequency-containment Services	Complete	Imperial College
NIA2_NGESO032	Course-correction Dispatch Instructor	Complete	University Of Strathclyde The University of Edinburgh
NIA2_NESO096	CSNP Decision Making Tool	Complete	Frazer-Nash Consultancy Ltd
NIA2_NGESO009	Data-Driven Power System Model Development for Control Interaction Studies (D3)	Complete	The University Of Birmingham
NIA2_NGESO043	Demand Flexibility Service Evaluation	Complete	Centre For Sustainable Energy ERM
NIA2_NGESO040	DETECTS II	Complete	Transmission Excellence Ltd
NIA2_NGESO075	Dispatch Decision intelligence	Complete	The Smith Institute

Ref Number	Title	Status	Partner(s)
NIA2_NGESO053	Exploring the economic benefits of co-optimising procurement of energy, response and reserve	Complete	FTI
NIA2_NGESO077	FastPress	Complete	Faculty AI
NIA2_NGESO037	Forecasting the Risk of Congestion	Complete	N-SIDE
NIA2_NGESO039	Future of the transmission network charging methodology	Complete	Frontier Economics
NIA2_NGESO048	GB Inertia Forecasting	Complete	General Electric
NIA2_NGESO036	Hydrogen production for thermal constraints management on the electricity transmission network	Complete	Arup And Partners Ltd National Grid Gas Transmission
NIA2_NGESO023	Inertia Measurement Method Optimisation	Complete	National Physical Laboratory (NPL)
NIA2_NGESO068	Market signals for the electrification of heating	Complete	WSP
NIA2_NESO098	Options for optimising GB Data Centres	Complete	McKinsey
NIA2_NGESO091	Quantitative assessment of self and central scheduling	Complete	FTI
NIA2_NGESO045	RealSim: Real-Time Phasor-EMT Simulations	Complete	University Of Warwick
NIA_NGESO072	Regional Whole Systems Strategic Planning (RWSSP) Methodology	Complete	Energy Systems Catapult
NIA2_NGESO024	REVEAL	Complete	Capgemini
NIA2_NGESO031	Service Provider Capability Mapping	Complete	LCP Delta

Ref Number	Title	Status	Partner(s)
10067856	SIF R1 Beta - INCENTIVE (Partner)	Complete	The Carbon Trust University Of Strathclyde Scottish & Southern Electricity Networks (SSEN)
10078792	SIF R2 Alpha - Powering Wales Renewably	Complete	SPEN National Grid Electricity Distribution National Grid Electricity Transmission Welsh Government Cenin Renewables CGI
10078787	SIF R2 Alpha - Scenarios for Extreme Events	Complete	Frazer-Nash Consultancy Ltd The Met Office University Of Strathclyde Scottish & Southern Electricity Networks (SSEN) National Grid Gas Transmission Cadent Gas
10103996	SIF R3 Discovery - Network Security in a Quantum Future	Complete	University Of Warwick Cambridge Consultants The University of Edinburgh
10104062	SIF R3 Discovery - Probabilistic Pathways for Energy System Planning	Complete	Frazer-Nash Consultancy Ltd National Grid Electricity Transmission

Ref Number	Title	Status	Partner(s)
10102926	SIF R3 Discovery - Blueprint (Partner)	Complete	Scottish & Southern Electricity Networks (SSEN) The Carbon Trust National Grid Electricity Distribution
10106177	SIF R3 Discovery - Fractal Flow (Partner)	Complete	Northern Powergrid Frazer-Nash Consultancy Ltd
10104053	SIF R3 Discovery - LookNorthH2: Offshore Energy Islands (Partner)	Complete	Guidehouse Europe Limited National Grid Gas Transmission
10101698	SIF R3 Discovery - REVISE (Partner)	Complete	Scottish & Southern Electricity Networks (SSEN) Gilytics Energyline Ltd The Met Office University Of Strathclyde
NIA2_NGESO065	Virtual Energy System: Common Socio-technical Framework Development	Complete	Ove Arup And Partners Ltd
NIA2_NGESO081	VirtualES: Data Sharing Infrastructure Pilot_Delivery Partners	Complete	Mesh-AI Ove Arup And Partners Ltd
NIA2_NGESO004	Trial on Implementation of Wide Area Monitoring and Control System	Complete	SPEN General Electric

Ref Number	Title	Status	Partner(s)
NIA2_NESO084	Alternative approaches to the ORPS methodology	Delivery	DNV
NIA2_NGESO063	Causational Analysis of Balancing Costs	Delivery	Imperial Consultants (ICON)
NIA2_NESO078	Consumer Building Blocks (Phase 2)	Delivery	Centre For Sustainable Energy ERM
NIA2_NGESO049	Data-Driven Online Monitoring and Early Warning For GB System Stability (DOME)	Delivery	University Of Bath Imperial Consultants (ICON)
NIA2_NESO092	Dispatch Transparency Methodology	Delivery	The Smith Institute
NIA2_NGESO066	Electrification of the residential heat sector: Spatial and temporal analysis of electricity demand and flexibility	Delivery	Cardiff University
NIA2_NGESO050	Enhanced RMS (e-RMS) models for stability assurance	Delivery	Imperial Consultants (ICON)
NIA2_NESO093	Extreme Weather and Climate Modelling (Dunkelflaute)	Delivery	The Met Office
NIA2_NESO073	Future Operator Console: Optimised Visualisation Design Principles	Delivery	Kings College London
NIA2_NESO095	Grid Connect X	Delivery	Manitoba Hydro International
NIA2_NGESO079	Hydrogen Plant Dynamic Models	Delivery	University Of Warwick
NIA2_NESO056	Impact of New Technology HGV's	Delivery	Ricardo AEA Ltd
NIA2_NGESO070	Incorporating the impact of climate change in power system modelling	Delivery	The Met Office
NIA2_NGESO067	Mass mobility data for demand forecasts	Delivery	The Floow The University Of Sheffield

Ref Number	Title	Status	Partner(s)
NIA2_NGESO051	MinGFM	Delivery	The University Of Birmingham
NIA2_NGESO041	Model-driven Strategy for Balancing Optimisation (MSBO)	Delivery	The Smith Institute
NIA2_NESO097	Net Transfer Capacity (NTC) Market Development	Delivery	FTI
NIA2_NGESO082	Neural BB	Delivery	Transmission Excellence Ltd
NIA2_NGESO052	Oscillation and Regional RoCoF Monitoring	Delivery	Reactive Technologies Ltd
NIA2_NGESO059	Power System Oscillation Characterisation using Wavelets and Trilateration	Delivery	Durham University
NIA2_NGESO035	Practical Transition into wider EMT GB Modelling	Delivery	Manitoba Hydro International
NIA2_NGESO002	PV Nowcasting	Delivery	Open Climate Fix
NIA2_NESO080	Regional Reserve (DRS)	Delivery	The Smith Institute
NIA2_NGESO083	Review of the Construction Planning Assumptions Methodology	Delivery	The University Of Manchester
10070764	SIF R1 Beta - Crowdflex	Delivery	Octopus Energy Ohme Centre for Net Zero Centre For Sustainable Energy The Smith Institute ERM National Grid Electricity Distribution Scottish and Southern Energy Power Distribution Limited

Ref Number	Title	Status	Partner(s)
10067854	SIF R1 Beta - Network-DC Circuit Breakers (Partner)	Delivery	Scottish & Southern Electricity Networks (SSEN) The University of Edinburgh The Carbon Trust
10121485	SIF R2 Beta - Powering Wales Renewably	Delivery	Cenin Renewables CGI National Grid Electricity Transmission SPEN National Grid Electricity Distribution Welsh Government National Grid Gas Transmission
10127933	SIF R2 Beta: CReDo+ (Partner)	Delivery	UKPN The University of Edinburgh Cadent Gas National Grid Gas Transmission Computational Modelling Cambridge Limited (CMCL) Science and Technology Facilities Council (STFC)

Ref Number	Title	Status	Partner(s)
10120244	SIF R2 Beta: Planning Regional Infrastructure in a Digital Environment (PRIDE) (Partner)	Delivery	National Grid Electricity Distribution Regen Advanced Infrastructure Technology Limited West Midlands Combined Authority
10129418	SIF R3 Alpha: Network Security in a Quantum Future	Delivery	Cambridge Consultants The University of Edinburgh
10127986	SIF R3 Alpha: Fractal Flow (Partner)	Delivery	Northern Powergrid Frazer-Nash Consultancy Ltd ElectraLink Ltd OakTree Power
10130442	SIF R3 Alpha - REVISE (Partner)	Delivery	Scottish & Southern Electricity Networks (SSEN) University Of Strathclyde National Grid Electricity Transmission The Met Office Energyline Ltd
NIA2_NGESO062	Space Weather Impact for Future Electricity System Resilience (SWIFTER)	Delivery	Frazer-Nash Consultancy Ltd The Met Office British Geological Survey
NIA2_NGESO046	STARTZ (Stability Requirements Calculation Towards Net Zero)	Delivery	TNEI Services Ltd

Ref Number	Title	Status	Partner(s)
NIA2_NESO090	Strategic Case for Tidal Range	Delivery	Ove Arup Partnership
NIA2_NGESO020	Strength to Connect	Delivery	Imperial Consultants (ICON)
NIA2_NESO106	Volta – Qualitative Benchmarking and Impact Analysis for Future Dispatching Tools and Capabilities	Delivery	Afry
NIA2_NESO108	Volta - Value and Feasibility Analysis for Input Data Models	Delivery	Mesh-AI
NIA2_NESO105	Volta: Real-time predictions	Delivery	University of Oxford IBM (UK) Ltd

NESO

National Energy System Operator

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