

Strategic Innovation Fund round three discovery: funded projects

1. Energy networks with projects approved

Network type	Lead project partner	No of approved projects
Electricity transmission	Scottish Hydro Electric Transmission (SHE)	3
	National Grid Electricity Transmission (NGET)	1
Electricity distribution	Electricity North West Ltd (ENWL)	2
	National Grid Electricity Distribution (NGED)	2
	Northern Powergrid (NPgN)	5
	Scottish and Southern Energy Power Distribution: Southern Electricity Power Distribution (SSEPD)	3
	Scottish and Southern Energy Power Distribution: Scottish Hydro Electric Power Distribution (SHEPD)	1
	SP Energy Networks (SPD & SPMW)	2
	UK Power Networks (SPN, LPN & EPN)	12
Electricity system operator	National Grid Electricity System Operator (NGESO)	2
Gas transmission	National Gas Transmission (NGT)	5
Gas distribution	Southern Gas Networks (SGN)	1
	Northern Gas Networks (NGN)	2
	Cadent Gas (Cadent)	1
	Wales & West Utilities (WWU)	2

2. Summary of projects approved by challenge

Network type	Project title and description	Lead applicant	Initial net funding required
Whole system planning and utilisation of networks to facilitate faster and cheaper network transformation and asset rollout			

Electricity distribution	<p>BluePrint - Building Industry Collaboration and Methodologies for Developing Offshore Wind Behind Constraint: Devising innovative and collaborative solutions to the key risks and uncertainties for the connection of offshore wind farms into currently constrained areas of the GB network, to maximise energy export.</p>	SHE	147,090
	<p>CLIP: Community Led Integrated Planning: Pioneering a community-led net zero digital planning approach for multiple clusters of communities, in collaboration with DNOs and local authorities, to develop unique and tailored decarbonisation plans.</p>	SPN	122,833
	<p>Cross Vector Energy Hub: Design and implementation of a multi-vector (gas + electricity) Energy Hub to optimise devices across a whole system, to increase resilience, operating efficiency, and hosting coordination.</p>	NPgN	117,305
	<p>Data Mate: Developing a partnership ecosystem and open data framework through crowdsourcing data, to better understand the impact of low carbon technology on the network, so that electricity networks can respond proactively and improve the customer experience.</p>	SPN	114,547
	<p>Electric Thames: Mapping the future of the electricity system around the Thames. Exploring new technologies such as Boat-to-Grid services, to shape whole system planning and offer insights for decarbonisation and electrification that can be replicated across GB waterways.</p>	LPN	130,050
	<p>Fractal Flow: Developing a tool which provides clear visibility of fractal flow, to unlock capacity, provide clearer status visibility and explore integration of powerful machine learning analysis and targeted data exchange across grid supply points.</p>	NPgN	141,649
	<p>HeatNet: Developing novel machine learning tools to manage power loads from heat pumps and help regulate voltage-drops at the grid edge, to accelerate the electrification of heat, improve voltage</p>	SPN	145,516

	quality and network reliability, and keep our customers warm.		
	KnowMyFlex: Creating Energy Flexibility Certificates, similar to EPC ratings, to provide a centralised view of the flexibility of homes and buildings, help customers engage and reduce their bills, and enable system operators to better forecast, plan and operate, reducing energy costs for all.	EPN	146,266
	MaxFlex: Creating Energy Flexibility Certificates for industrial, commercial, and local authority buildings, adding electricity network capabilities, connection arrangements and market opportunities to reduce bills and create more efficient electricity networks.	SSEPD	137,102
	Nature4Networks (N4N): Exploring the use of nature-based solutions to protect assets from problems such as flood risk and extreme heat. Reducing carbon intensive construction of hard engineering solutions, with effective natural options that provide climate, biodiversity, social and wellbeing benefits.	SSEPD	148,247
	Road to Power: Developing specific tools to forecast future energy consumption and infrastructural impact of works, to support the street and road works sector as it decarbonises 7.8TWh of energy demand across 700,000 major works in the sector's pivotal transition to net zero by 2030.	NGED	141,229
	Rural Energy And Community Heat (REACH): Working with rural community energy groups to develop a modular rural energy centre that will help communities make cost effective decarbonisation plans. The solution will offer shared low carbon heating, rapid EV charging, and renewable generation in areas not served by commercial markets, and where there is limited electricity network capacity.	NGED	116,995
	SANND (Scenario Analysis for Non-Domestic Network Decarbonisation): Developing a software tool to visually display scenarios of additional demand on electricity distribution networks at different	NPgN	144,831

	time points based on bottom-up modelling. Allowing network planners to pre-emptively plan infrastructure upgrades and cost effectively support each customer's decarbonisation journey.		
	SeaChange: Developing a replicable, port-level investment model to explore transition scenarios to achieve zero emissions shipping by 20250, across the notably complex and diverse maritime sector. The model will also inform and enable ports and their users to plot their most viable decarbonisation paths.	SHEPD	149,431
	UN:LOCK - Unblocking Networks: Local Optimisation, Consumers and Knowledge: Exploring novel market-based solutions to create capacity in areas of high penetration of distribution connected generation, to allow the connection of additional generation while long-term reinforcements are being delivered. This will create local economic benefit for both generators and consumers and accelerate progress to net zero.	SSEPD	101,373
	Wayl-ease: Creating a transparent, but secure, external-facing record of consent by public and private landowners to dig up their ground and install network equipment. Automation of manual process and giving customers visibility will improve planning, speed up network transformation and inform customers.	EPN	110,637
Electricity transmission	HIRE – Hybrid-Network Improvement & Reliability Enhancement: Researching new state-of-the-art condition monitoring to improve the commissioning and operation of offshore cables. This new, robust system will mitigate the risk of failure, overcome the limitations of existing techniques (e.g. cable length) and aid network operators in decision making for a more flexible grid.	NGET	135,082
Electricity system operator	Probabilistic Pathways for Energy System Planning: Developing an enhanced end-to-end network planning methodology for the whole energy system,	NGESO	149,544

	using artificial intelligence and probability modelling to capture risk and uncertainty within future energy pathways. This will enable rapid needs analysis, risk-based options assessments, and delivery of optimised planning decisions.		
	Regional Energy Strategic Modelling (RESM): Developing and testing a system dynamics tool for use by regional energy strategic planners. This first-of-its-kind project aims to establish joined-up thinking between gas, electricity, and water distribution networks to deliver regional decarbonisation paths, including the first regional energy plan for North East England.	NGN	110,526
Gas transmission	Carbon and Hydrogen transportation to SAF production facilities: The aviation industry is responsible for around 8% of the UK's carbon emissions. This project will explore how hydrogen and carbon networks could support UK sustainable Aviation Fuel (SAF) production and accelerate the aviation industry towards net zero.	NGT	118,707
	HyNTS Maritime: Determining how the National Transmission System (NTS) could support UK maritime ports provide links to large scale hydrogen infrastructure across the UK. Looking at technical requirement of facilities to enable UK users access to imported hydrogen and moving hydrogen from UK production facilities to ports for direct use or export.	NGT	150,000

Novel technical, process and market approaches to deliver an equitable and secure net zero power system

Electricity distribution	Balancer: Exploring business models that encourage, or allow, the installation of community batteries to balance energy equity for disadvantaged communities unable to install expensive, low carbon technologies such as home battery storage and heat pumps.	SPN	149,557
	CarbonFlex: Engaging with landlords and tenants to co-design a carbon flexing	LPN	129,727

	service that delivers value to low-income households, and a dynamic resource to manage local grid congestion.		
	Equiflex: Focussing on equal access to financial and environmental benefits for hard to engage and vulnerable customers, ensuring no consumers are unfairly left behind and enabling a just transition to net zero.	SPD	133,704
	Flex Direct: Transforming the roll out of energy efficiency upgrades, by developing novel commercial models and coordinated market approaches that enable local authorities and social housing providers to work with DSOs to incentivise and facilitate participation for hard-to-reach customers.	LPN	139,662
	Fuel Cell Renewable Energy Equity (FREE): Exploring how fuel cell micro combined heat and power (CHP) systems can provide uninterruptable power supply (UPS) functionality for individual homes, as well as support other nearby homes which depend on direct electrification to provide heat, power, and mobility.	NPgN	112,827
	GridLink: Demonstrating the use of a digital support system (DSS), to optimise the placement and running of smart switches which dynamically link multiple low voltage (LV) feeders at multiple points in the LV network, to improve customer support.	NPgN	131,925
	LDES NODE: Developing a methodology and mapping tool to inform optimal location of long duration energy storage, (LDES), technologies on the electricity distribution network, to provide data driven insights and coordinated net zero energy plans.	ENWL	145,953
	LV Optimiser – LVOE: Focusing on an innovative low voltage (LV) power electronic device, (LV Optimiser), with its novel control algorithm to address LV	SPMW	142,136

	voltage quality and imbalance, to support the growing demand and adoption of low carbon technologies (LCTs) such as solar panels, electric vehicles, and heat pumps.		
	SizeWise: Focusing on defining the needs of house types and occupancy combinations, to identifying simple tools and support customers in choosing the right size and optimal mix of low carbon technology to suit their needs and their budget.	EPN	145,937
Electricity transmission	REVISE - Revisiting and Evaluating Environmental Inputs on Line Ratings: Using latest generation high-resolution weather topographic data, combined with the latest techniques for system modelling, to improve understanding and methodology of line ratings and meet demand for connection of new renewables.	SHE	149,854
	SYSMET - System Strength Measurement and Evaluation: Bringing together leading experts to create a pathway to confident implementation of measurement-based tools that provide comprehensive visibility of system strength status, avoiding uncontrolled voltage change, instability, and the risk of widescale customer disconnections.	SHE	99,733
Electricity system operator	Network Security in a Quantum Future: Investigating the quantum threat to the energy system's cybersecurity, helping the industry to understand the actual threat from state actors, organised crime, and other threats, and enabling mitigation strategies to be developed.	NGESO	149,621
	Gas Volume for Embedded Electrical Generation Modelling: Designing a notification platform for embedded generators to inform Gas Distribution Networks of upcoming demands, combined with electricity market forecasting and advanced machine learning techniques to refine embedded gas demand forecasts	SGN	123,830

	Hydrogen Storage in Aquifers: Assessment and modelling of the reservoir performance of known geological structures, as an alternative to using depleted gas fields for large-scale storage of hydrogen in a net zero system.	WWU	111,580
	Look NorthH2: Exploring potential benefits and associated costs of developing offshore energy hubs (OEHs) in the UK. developing scenarios that quantify benefits such as curtailment reduction, grid losses reduction, and infrastructure optimisation. OEHs could stimulate integration of offshore electricity/hydrogen production between the UK and European countries.	NGT	128,329

Unlocking energy system flexibility to accelerate electrification of heat			
Electricity distribution	CoolDown: Despite modelling suggesting increasing cooling demand in office, retail and domestic spaces as the UK warms, cooling demand is currently poorly accounted for in distribution network planning. Additionally, its potential to offer flexibility during periods of network stress has not been considered. Cool Down will be the first project to consider cooling's potential as a flexible load.	ENWL	149,996
	OptiHeat: Developing a first of its kind tool that will recommend the most effective sizing and combination of low carbon technology (LCTs) upgrades. Empowering consumers, including the vulnerable and social housing landlords, to make effective decisions on building fabric upgrades, heat pumps and/or renewable energy technology installations, promoting an inclusive rollout of right sized LCTs.	SPN	113,324
	WASH (Wastewater Sourced Heat): Investigating the feasibility of wastewater heat as a source for heat pumps that	EPN	125,264

	supply district heating (DH). Exploring how water companies, DH network operators and DNOs can work collaboratively.		
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Enabling power-to-gas (P2G) to provide system flexibility and energy network optimisation			
Gas distribution	ALCHEM: Advanced Low Carbon Hydrogen and Energy Management: Using innovative biomass electrolysis technology to produce safe, low-cost green hydrogen, using less energy than water electrolysis.	WWU	87,436
	Exploring Geological Hydrogen Storage Opportunities for the East Midlands (EMStor): Investigating options for storage of excess renewable energy for use during periods of peak demand.	Cadent	138,382
	PATCH: Production And long-Term Containment of Hydrides: Using waste energy to produce chemical hydrides to provide the future hydrogen system with an economic and safe long term storage solution.	NGN	147,528
Gas transmission	Realistic modelling of power-to-gas operability: Developing a network of models simulating the operation of decarbonised future GB energy system scenarios, to support operational decision making.	NGT	128,475
	B-Linepack+: Exploring the feasibility of purpose-built geological hydrogen storage solutions, e.g. lined shafts, engineered rock caverns; to provide flexibility and effectively manage supply and demand across the network.	NGT	150,000