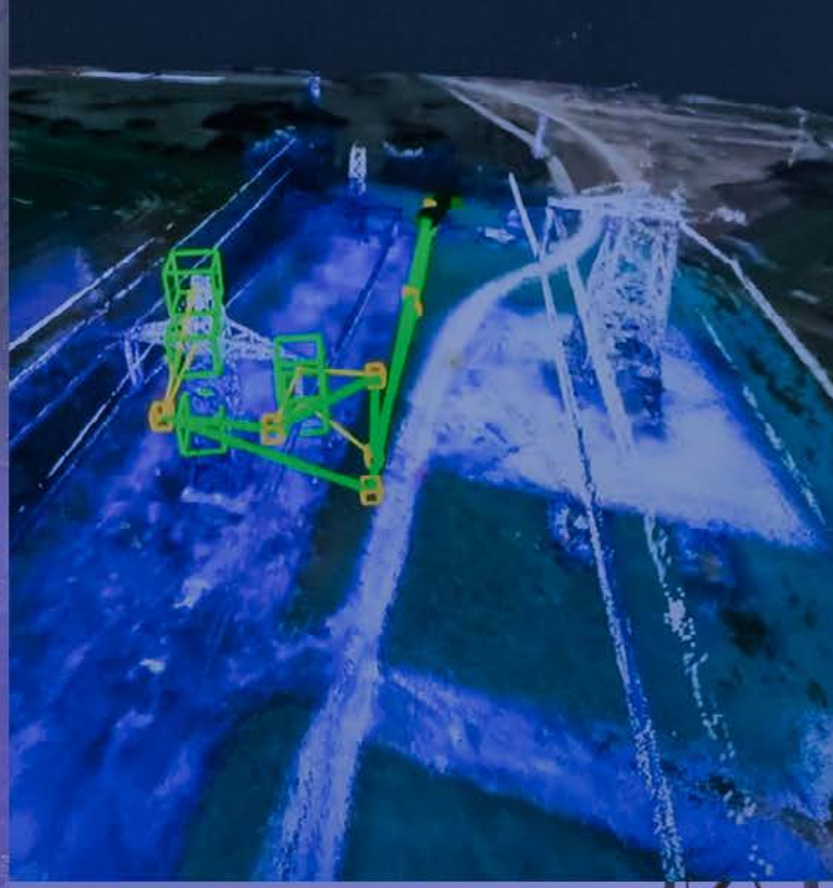
Electricity Transmission

# Innovation Annual Summary 2024/25



nationalgrid

# Welcome to our interactive Innovation Annual Summary

Look out for this symbol for the interactive content throughout the document.

If you experience any difficulty viewing the interactivity, **click here** for the online version.



**Who we are and what we do**

National Grid Electricity Transmission (NGET) owns and maintains the high voltage electricity transmission network in England and Wales.

Every time a phone is plugged in, or a switch is turned on, we've played a part, connecting you to the electricity you need.

We take electricity generated across England and Wales, including from windfarms and nuclear power stations, and transport it through our network, consisting of more than 7,000 kilometres of overhead line, 700 kilometres of underground cable and over 300 substations, on to the distribution system, so it reaches homes and businesses.

We're investing in the network, connecting more and more low-carbon electricity – it's a crucial role and pivotal in turning the UK's net zero ambitions into reality.

# Welcome to our Innovation Annual Summary 2024/25

**NGET's Business Plan for RIIO-T3 outlines how electricity transmission can drive economic growth and support the UK's transition to a low-carbon future. We aim to nearly double our power transfer capacity and more than double the rate at which we connect customers – ambitious goals that demand equally ambitious innovation.**

Innovation is essential to keep pace with emerging technologies and the rapid scale-up of infrastructure. It also supports national priorities like energy security, cost of living, economic growth, industrial renewal, and job creation.

That's why we launched our new Innovation Strategy in 2025. It focuses on delivering real benefits for consumers and the industry, with greater emphasis on rollout, implementation, and tracking performance as innovations deploy onto our network and become business as usual.

To meet the pace of decarbonisation, we're also reviewing our innovation processes to become more agile and accelerate delivery. Building on a strong foundation from RIIO-T1 and T2, our innovation investment has grown significantly – reaching £18.3 million last year.

With a growing number of projects entering business as usual, we're well positioned to support our business plan and the energy transition with proven innovation capabilities.

**Owen Wilkes**
Network Design Director

Our innovation investment has grown significantly – reaching
£18.3m
last year.

"We're well positioned to support our business plan and the energy transition with proven innovation capabilities."

**Owen Wilkes**
Network Design Director

# Our new Innovation Strategy

**In 2025 we published our new Innovation Strategy. NGET will need to carry out an enormous volume of infrastructure work to enable a low-carbon economy. Our strategy reflects this, supporting both the drive towards net zero, and the Government's Clean Power 2030 agenda, which will seek to speed up the connection of new power infrastructure to the grid.**

It's crucial that the innovation work we do to support the drive towards net zero provides real benefits for consumers, customers and our industry. So, we've made sure our strategy demonstrates how we'll deliver these benefits – with greater emphasis on our innovation focus areas of collaborative working, implementation, and tracking how our innovations perform once they become business as usual.

## Our four focus areas

For our new Innovation Strategy, we've created four focus areas and updated our outcomes:

- **Build the Future Network**
- **Accelerate Customer Connections**
- **Enhance Sustainability**
- **Improve Resilience**

## How we'll innovate

Find out more by hovering over each segment within our strategy model.


"Our RIIO-T3 business plan is ambitious in its scale and we're ensuring our innovation is delivered with pace and delivers clear benefits to consumers, the industry and networks."

**Gary Stockdale**
Net Zero Innovation Manager, NGET

## A strategy aligned to our RIIO-T3 business plan

Our new strategy is closely aligned with NGET's RIIO-T3 Business Plan proposal, which was developed at the same time. The plan includes an unprecedented level of investment of up to £35 billion over the five years to March 2031. From an innovation perspective, it will enable us to deploy technologies such as power control devices, and dynamic line ratings to maximise the capacity of our existing infrastructure.

The plan represents the most significant step forward in the electricity network that we've seen in a generation. Through it, we'll nearly double the amount of energy that can be transported around the country. We'll support the electrification of the industries of today and tomorrow. We'll also create new jobs and support inward investment for the UK.

# Our innovation in numbers

## **NIA** Projects

**95**
live RIIO-T2 NIA projects

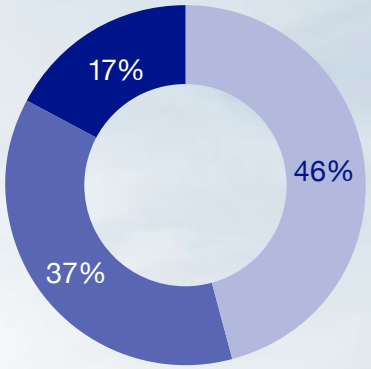
**21**
NIA projects registered in 2024/25

**£18.3m**
spend on NIA projects in 2024/25

**£19m**
forecast spend on NIA projects in 2025/26

**72**
collaborators, including suppliers, partners and supporters

**14**
FTEs working on NIA innovation projects




Distribution of Technology Readiness Level by volume of NIA projects in RIIO-T2

- Research (TRL 2-3)
- Development (TRL 4-6)
- Demonstration (TRL 7-8)

## **NIC** Projects

**2** Ongoing NIC projects

## **SIF** Projects

**15** RIIO-T2 SIF projects awarded

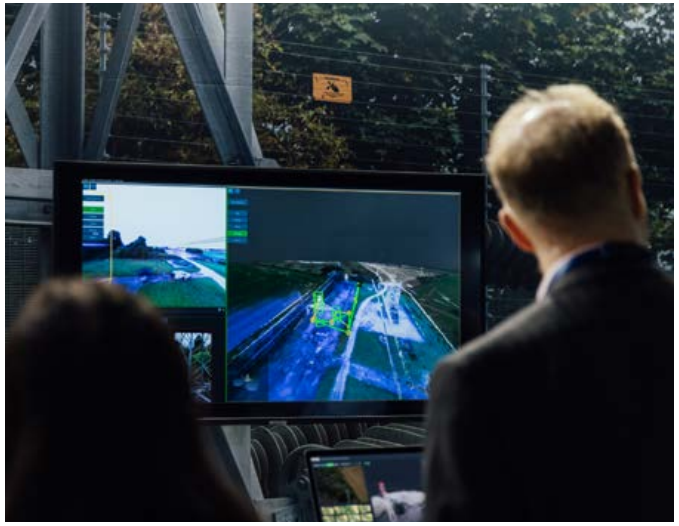
**2** SIF-led Discovery projects awarded 2024/25

**2** SIF-led Alpha projects awarded 2024/25

**1** SIF-led Beta project awarded 2024/25

**4** FTEs working on SIF innovation projects

# Portfolio overview



## Our NIA projects

Our NIA projects are delivering ambitious innovations that will help us achieve our net zero targets. They're clearly aligned to the outcomes we've set out in our Innovation Strategy.

During 2024/25, we increased our portfolio, spending £18.3 million on NIA projects during the year. We registered 21 projects, which brings our total of live NIA projects during the RIIO-T2 period to 95. We're also collaborating on 15 NIA projects that are being led by other networks.

In addition to BAU deployments from our T1 NIA portfolio, we've deployed three of our innovations during 24/25 into our business in addition to several other innovations deployed from RIIO-T2 and RIIO-T1.

Click to read more about our **NIA projects** on **page 10**

## Strategic Innovation Funding

Through Strategic Innovation Funding (SIF), we progressed five projects that were granted SIF funding of £9,588,394 during 2024/25.

We were given the green light to progress project DEsign for Live Line Technology Acceleration (DELLTA) and Hybrid Network Improvement and Reliability Enhancement (HIRE) to the first Discovery phase. While two of our projects – Assessment of Superconducting Technologies for Standards Development and LookNorthH2 – advanced to the Alpha phase of funding.

Our $SF_6$ Whole Life Strategy project marked an exciting milestone for NGET as it moved into the Beta phase of funding. This funding will allow us to test groundbreaking innovative solutions on a scale that will support future commercialisation and integrate into the UK energy networks.

Click to read more about our **SIF projects** on **page 19**

## Our NIC projects

Our Deeside and RICA projects are two significant areas of work that have continued from RIIO-T1.

For our RICA project, we've now completed the 0.5km test line built at our training facility at Eakring. The test line offers an opportunity to demonstrate what a RICA OHL route would look like, and how it is constructed and maintained.

Our Deeside Centre for Innovation continues to offer its facilities as a test ground for important innovation projects that don't require high voltage.

Click to read more about our **NIC projects** on **pages 21 to 26**

# Implementation and rollout

**Our innovation work is increasingly being adopted into business as usual throughout NGET. During 2024/25, three of our innovations were deployed within our business in addition to several other innovations deployed from RIIO-T2 and RIIO-T1.**

**As we approach the end of RIIO-T2, more of our projects are set to conclude, so we expect more of our work to become business as usual over the coming months.**

### Modernising pylon inspections with advanced drones and AI

Through our innovative 'VICAP' project, we've fully automated the way we capture and process corrosion-related condition assessment data for the steelwork on our pylons. By using drones and AI technology, we can reduce our use of helicopters. That means less fuel and maintenance costs, faster processing times for assessments – and around £630,000 of annual savings for consumers.

Read more

### How smart technology is helping predict flood and erosion risk

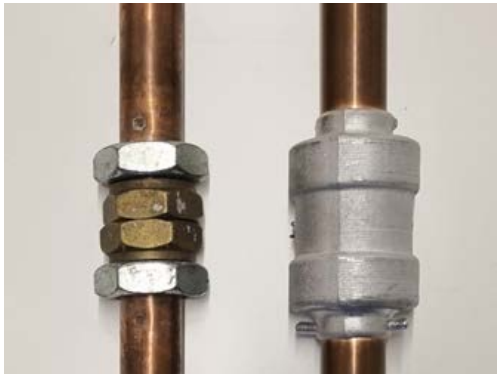
Our automated severe weather alert tool is helping us protect vulnerable assets at risk from extreme weather events. This novel early warning system, which can help us better react to threats when they emerge, has the potential to save up to £6 million of repair costs while boosting the resilience of our network.

Read more

### Understanding our HVDC environmental impact

We've assessed the carbon impact of high voltage direct current (HVDC) transmission systems through their entire lifecycle, which are being much more widely used in electricity networks. By adopting the research's recommendations, we could reduce emissions by more than 15% or the equivalent of 113,000 tonnes of $CO_2$ total emissions. The research is also helping inform our sustainability considerations and decision-making for future HVDC projects.

Read more



### Fixing $SF_6$ leaks without disruption

In addition to these innovations, our successful work to remedy $SF_6$ leaks continues to be rolled out within NGET. Since 2022, we've saved the equivalent of some 9,000 tonnes of $CO_2$ from direct $SF_6$ emissions to the atmosphere by using a novel technology to fix leaks – and it's all been done without the need for an outage, keeping our critical infrastructure in service. That's a double benefit for consumers, as we reduce environmental impact and keep electricity flowing around the country.

Read more

# Working with others

**Collaboration is a crucial part of the way we work, and central to how we'll achieve our ambitious objectives. We work with other organisations through:**

- **Industry working groups and memberships** – including the Electric Power Research Institute (EPRI), CIGRE, the Infrastructure Industry Innovation Partnership (i3P), the Institute of Electrical and Electronics Engineers (IEEE), the Energy Innovation Centre (EIC) and the Energy Networks Association (ENA).
- **University partnerships** – working with researchers, analysts and academics from Cardiff, Edinburgh, Exeter, Manchester, Southampton and Strathclyde Universities.
- **Calls for innovation** – promoting our engineering challenges, seeking ideas and innovative solutions from prospective partners.
- **EIC calls for innovation** – partnering with the EIC, whose wide-ranging stakeholder base helps bring us closer to small and medium-sized enterprises (SMEs) and gives us the opportunity to collaborate with networks.
- **Leading Edge Only partnership** – helping generate innovative ideas from the innovation community.
- **ENA Basecamp** – an opportunity for networks and innovators to engage and address specific challenges.

By engaging wider with the innovation community, we're now working with more businesses than ever, nearly half of which are SMEs.

### Collaborating through our whole system approach

The whole energy system encompasses the interaction between electricity, gas and liquid fuels. Our whole system approach considers how these energy sources best contribute to delivering net zero energy for technology, communications, transport, heat, water and other industries. This means we need to not just think about what's changing within the energy sector, but far beyond it too.

Other industries will be innovating to support the transition to a low-carbon economy. We are working with partners across the whole system and see this increasing over time. We're already working on whole system projects with partners, some of which we've summarised below.

## Track to Zero

Through our Track to Zero project, we're assessing the impact of 100% railway electrification on the transmission network across England and Wales. We're considering existing and future congestion points, while exploring a battery storage solution to support railway electrification. Learnings from the project will help GB network licensees and Network Rail determine investment strategies for a sustainable rail network. You can read more about this project on page 14.

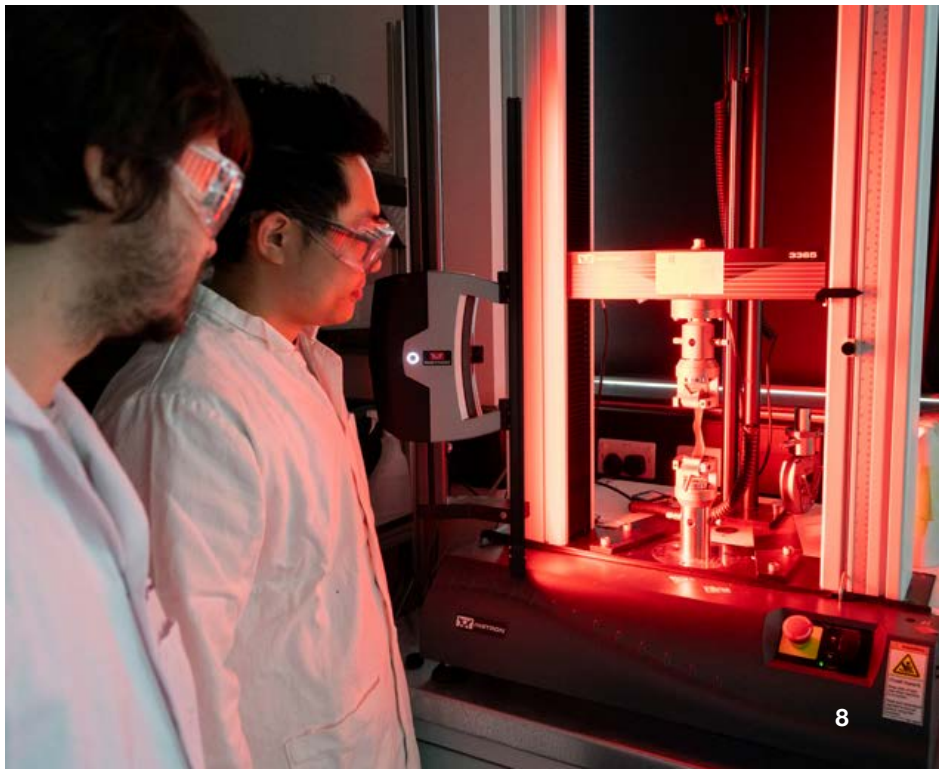
## DC Connect

The rapid growth of data centres is creating significant demand on the electricity network. Our DC Connect project aims to provide a long-term view of data centre demand. This will equip network planners and connection engineers with the data and insights they need to assess future demand impacts more accurately; test mitigation strategies; and make faster, more informed investment and connection decisions. You can read more about this project on page 13.

## Energy Water Nexus

The UK Climate Change Risk Assessment 2017 Evidence Report highlights numerous risks to energy sector infrastructure from drought and flooding. Studies have also shown that energy systems are likely to have an increased reliance upon water-intensive technologies – such as nuclear, bioenergy, electrolysis, and carbon capture and storage (CCS).

This project has helped us define water constraints out to 2050, using whole energy systems modelling. Building on this work, future energy system planning should incorporate better consideration of water constraints and their impacts on the energy system and its networks.



# Dissemination and engagement

**During 2024/25, we were involved in a wide range of hybrid and virtual events, providing us with the flexibility to reach ever-wider audiences, meeting them in ways that best suit their needs. Events we attended, or helped shape and deliver, included:**

- Utility Week Live
- The Energy Innovation Summit
- CIGRE Paris 2024
- Innovation Zero 2024
- UHVNet 2024
- London Climate Technology Show
- UPEC.

We hosted a number of stakeholder events to share and gain feedback on our 2025 Innovation Strategy. We also collaborated with National Grid Partners on the successful UK Innovation Day 2024.

At some events we've been joined by the partners we're working with on specific innovation projects, so they can provide their perspective and expert knowledge when talking to stakeholders about the work we're doing together and how we're supporting the drive to net zero.

In September 2024, we delivered an event focused on innovation work to reduce $SF_6$ emissions. An audience spanning the utility, manufacturing and academia sectors heard the latest updates on solutions that we, other networks and suppliers have been developing to reduce $SF_6$ emissions from our networks.

The event, held at the University of Manchester, included guest speakers from Réseau de Transport d'Électricité, SINTEF, Siemens Energy, GE Vernova and Hitachi Energy.


We welcome ideas, feedback and your views on how we engage with you. If you'd like to get in touch, you can find our contact details on the **final page** of this report.

# Our innovations

## Case studies

### Improve Resilience

- Intercompatible CAble REpair (iCARE)
- Robot, AI and Drone Enhanced Detection of Discharge (RAIDEDD)

### Accelerate Customer Connections

- DC Connect
- Track to Zero

### Enhance Sustainability

- $SF_6$ Whole Life Strategy
- EcoBuild 3D: Sustainable Substation Foundations

### Build the Future Network

- Optimum Wide Area Power Flow Control Solutions
- High temperature superconductors (HTS)

## Funding through the NIA

# A universal repair approach for high-voltage underground cables

**Project name:**
Intercompatible CAble REpair (iCARE)

**Project number:**
NIA2_NGET0063

**Focus area:**
Improve Resilience

"The iCARE project promises a solution to an increasingly pressing challenge – finding a faster and more efficient way to repair our high-voltage underground cable assets."

**Kerri Hayes**
Associate Innovation Engineer

## Project overview

The UK has an ambitious target to deliver 43–50GW of offshore wind by 2030. Connecting increasing volumes of offshore wind means that any failure of high-voltage underground cable assets poses a threat to network resilience.

We predict that 50% of our 275kV and 400kV cables will be subject to constraints in the future. Few studies to date have looked specifically at the risks posed by complex repairs to high-voltage cable joints.

Repairing a high-voltage underground cable system is time-consuming and expensive. There is currently no plug-and-play solution available for 275kV or 400kV cable repairs for emergency return to service (ERTS). Additionally, there is a growing shortage of certified and skilled cable jointers capable of undertaking complex repair of transmission rated cables.

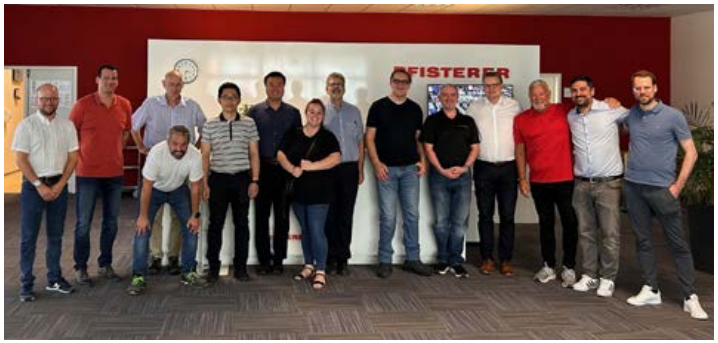
The iCARE project aims to develop a universal repair approach that will significantly reduce the time required to repair a transmission rated cable fault. This would minimise outage times, strengthen network resilience and reduce repair costs.

## How has the project progressed?

We're working alongside German firm Pfisterer and the University of Manchester to develop and test a universal joint solution that would enable prompt return to service following a cable fault.

Pfisterer's existing ERTS solution can be applied to cables up to 170kV. The company is carrying out design analysis for a 400kV application, addressing limitations on weight and size, handling issues and improving the epoxy curing process.

In 2026, the University of Manchester will undertake high voltage testing of a connector prototype developed by Pfisterer to validate the proposed solution and ensure it can be scaled up to 400kV. University researchers will also take the lead on identifying and developing technical viable field grading materials for high voltage connector technologies to be deployed for transmission networks.




The aim is to develop a modular approach where jointers will first prepare both ends of the cable with male connectors. A factory-tested female joint could then be shipped to site for assembly and energisation.

A subsequent project in the next price control is planned to fully test the proposed solution at both 275kV and 400kV if this initial project is completed successfully.

## What are the key benefits?

# Developing an ‘early warning system’ to protect asset health

**Project name:**
Robot, AI and Drone Enhanced Detection of Discharge (RAIDEDD)

**Project number:**
NIA2_NGET0060

**Focus area:**
Improve Resilience

“The RAIDEDD project will achieve a step change in PD monitoring with smart use of technology that gives us early warning of potential defects.”

**Gordon Wilson**
Lead Innovation Engineer

## Project overview

Early warning of potential defects in high-voltage assets helps improve resilience and keeps the network running smoothly. In this project, we’re studying the combined potential of drone technology, deployment of a robot ‘canine’ called Spot, and greater use of artificial intelligence (AI) to tackle the problem of partial discharge (PD).

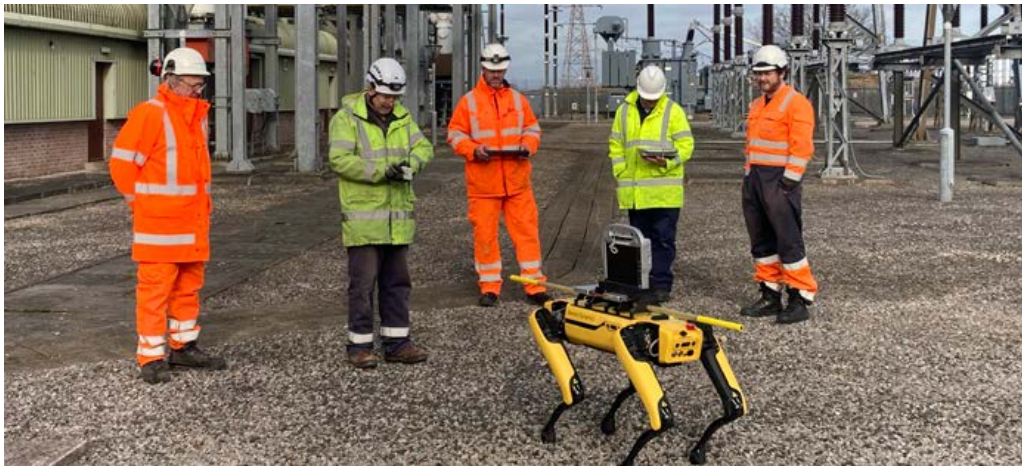
PD is a signal that an asset in a substation has a defect. It happens when there is an electrical discharge within the insulation that does not bridge the insulation gap between conductors.

If left unchecked, the issue can ultimately lead to asset failure. Currently, we carry out routine manual PD monitoring at substations every three months. It’s a time-consuming task that involves hand-held equipment. Pinpointing the exact location of PD and interpreting the signals can be challenging. Fixed condition monitoring systems can also be used but tend to be very expensive and have limitations.

## How has the project progressed?

For the RAIDEDD project, we’re working with PD monitoring specialist Elimpus, timing and synchronisation technology firm Chronos Technology, and the Universities of Strathclyde and Cardiff.

Elimpus is integrating its PD monitoring technology into Spot – a robotic dog developed by Boston Dynamics that’s already being used elsewhere in National Grid. The robot is equipped with aerials on its back and can manoeuvre around a substation site to survey for PD. It could be particularly useful for risk management hazard zones, enabling us to keep working safely.



Initially, the robot will be guided by a controller, but in the future it could operate autonomously. Testing has taken place at our Deeside Centre for Innovation, alongside early trials in the substation environment.

We also have two separate workstreams investigating the use of drones. They include work to optimise a PD monitor for use on a small drone and a new PD detector that requires further testing and development.

Finally, the project is using AI to investigate the optimal placement of aerials within a substation to maximise location accuracy, alongside advanced data analytics to provide a clearer picture of any PD issues.

## What are the key benefits?

# Managing future data centre demand

**Project name:**
DC Connect

**Project number:**
NIA2_NGET0092

**Focus area:**
Accelerate Customer Connections

"As data centre demand accelerates, it becomes critical to understand not only the total load increase, but also the location, timing, and operational characteristics of these new facilities. This project focuses on visualising data centre growth alongside a review of possible network congestion mitigation strategies."

**Neha Moturi**
Innovation Engineer

## Project overview

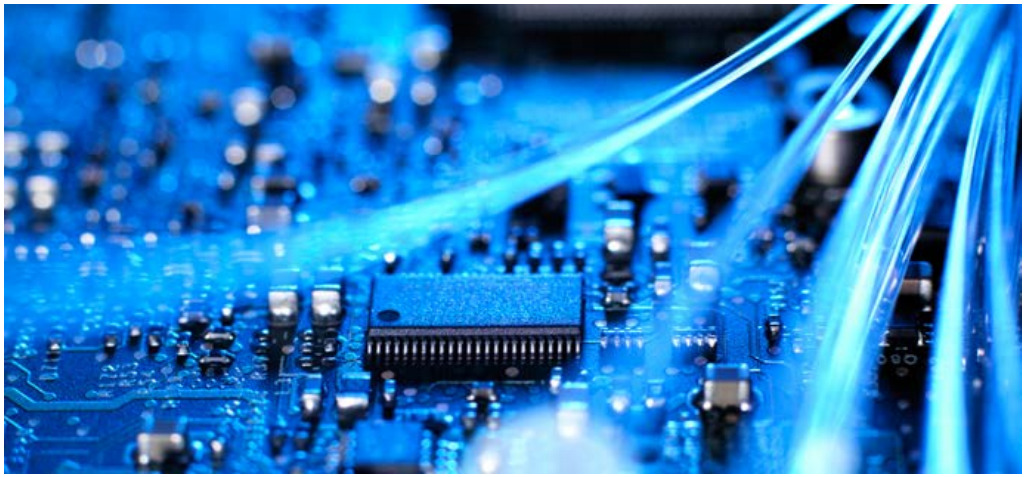
The rapid growth of data centres, mainly as a result of digitalisation, AI and cloud services, is creating significant demand on the electricity network.

Through this project, we want to provide a long-term view of data centre demand. This will equip network planners with the information and insights they need to assess the impact of future demand more accurately. They'll also have a better understanding of mitigation strategies available to manage data centre demand and make faster, well-informed investment and connection decisions.

## How will you go about gaining this long-term view?

The initial part of the project will involve establishing an evidence base for data centre developments, including existing and pipeline projects, siting drivers, growth patterns and developer perspectives. This research piece will be coupled with spatial and statistical modelling to identify potential locations for data centre development, helping us to better understand data centre growth in both the short and long term.

These new learnings are anticipated to be integrated into existing network planning tools already in use within NGET. Network Planners can leverage these additional capabilities to determine where the hotspots on the network will be at various points in the future. In addition to this, the grid and non-grid solutions available to manage the data centre connections will also be provided.



## What sort of mitigation strategies will the project be considering?

Non-grid strategies will include flexible or interruptible data centre operation, use of behind-the-meter generation or storage, and co-location with renewable assets. Grid strategies might include specific types of reinforcements, inter-trip schemes or network reconfiguration. The strategies we will have access to will be explored in greater detail as part of the project.

## Who are you collaborating with?

TNEI Group will be leading the delivery of this project. Throughout the project, we plan to engage with the relevant stakeholders, including data centre operators and the NESO, so we can better understand demand and anticipated growth over the long-term.

## What are the key benefits?

# On track to manage rail demand

**Project name:**
Track to Zero

**Project number:**
NIA2_NGET0085

**Focus area:**
Accelerate Customer Connections

"This project is a prime example of how the energy and transport sectors can work together and support each other's decarbonisation ambitions efficiently through the application of an innovative battery storage solution."

**Neha Moturi**
Innovation Engineer

## Project overview

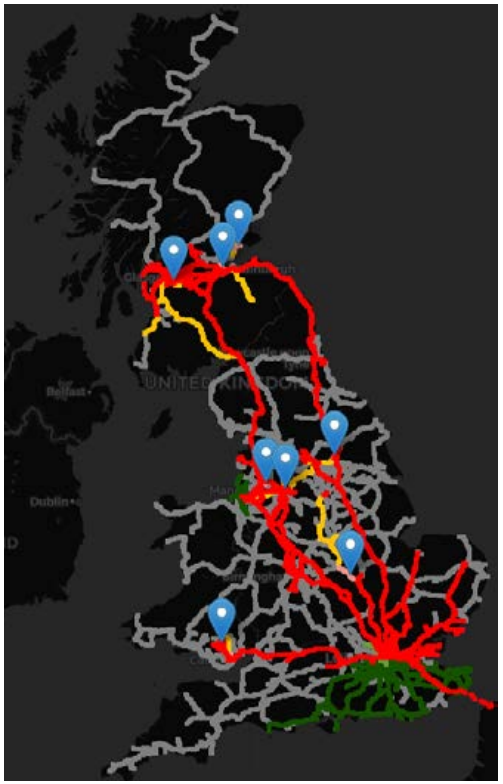
Transportation accounts for the largest share of greenhouse gas emissions in the UK, while the rail industry is the single largest consumer of electricity – using 4TWh annually, which represents 1.2% of the UK's total electricity consumption.

Additionally, some 60% of the UK's 20,000 miles of railway tracks are non-electrified. Planned railway electrification brings challenges to the transmission network, including increased power demand, reinforcing connections to rural areas, and managing inflexible demand.

To date, all planning studies have been in Scotland and currently there is little understanding on the infrastructure requirements and congestion areas for England and Wales.

## How will the project address these issues?

Through Track to Zero, we're assessing the impact of 100% railway electrification on the transmission network across England and Wales. We'll be studying the role of battery storage, also called an Energy Hub in this project, in supplying railway traction power where feasible. It can also function as a feeder station to support battery-powered trains in rural areas, avoiding the need to build new conventional feeder stations. Learnings from the project will help GB network licensees and Network Rail determine the optimal investment strategies for a sustainable rail network.



Non-electrified railway routes (grey) versus electrified ones (red).

Through Track to Zero, we're assessing the impact of

**100%**

railway electrification on the transmission network across England and Wales.

## Who are you collaborating with?

We're working with our Scottish counterparts, who have already done some railway electrification studies in their area of service, and also Network Rail, to ensure we align with their decarbonisation ambitions.

## What are the key benefits?

# Engineering a smarter, cleaner $SF_6$-free grid

**Project name:**
$SF_6$ Whole Life Strategy

**SIF reference number:**
11061098

**Focus area:**
Enhance Sustainability

"Through this project, we are taking a leading role in minimising the global impact of $SF_6$ emissions on the environment. We will be able to minimise our emission-related environmental impact and pave the way for other utilities to do the same."

**Mark Waldron**
Net Zero Asset Strategy
Technical Leader

GIS substation with a non-$SF_6$ multianalyser and sampling kit.

## Project overview

Sulphur hexafluoride ($SF_6$) is widely used to insulate high-voltage equipment on the transmission network. But it's a greenhouse gas with a global warming potential 24,300 times that of $CO_2$. This project is about developing an efficient replacement and management strategy for $SF_6$ to support the UK's clean energy goals.

We're exploring $SF_6$-free technologies and how they perform in real conditions. That includes looking at whether it's technically and economically viable to retrofit older equipment with alternative gases. We're also developing new tools to predict leaks and looking at how to scale up more sustainable $SF_6$ disposal.

**$SF_6$**
Sulphur hexafluoride ($SF_6$) is a greenhouse gas with a global warming potential 24,300 times that of $CO_2$.

## How has the project progressed?

It's been a milestone year. We completed the Alpha phase, which included developing and testing a new leakage forecasting model; trialling an innovative plasma-assisted decomposition for cleaner $SF_6$ disposal; analysing $SF_6$-alternative gases that are already in use; and carrying out cost-benefit analysis of a range of intervention options.

Thanks to that work, we secured £9.79 million funding for the Beta phase, which will run for four years. This next stage will focus on scaling and proving the best solutions, so we can provide a range of 'oven-ready' options that support decarbonisation.

## How have you involved stakeholders in this work?

We've worked closely with experts and partners, including the University of Manchester, SSEN Transmission, SP Energy Networks, DNV, DILO and WIKA. We also regularly share updates with a Technical Advisory Board that includes other stakeholders, including EPRI, ENA, Cardiff University, University of Liverpool, the Environment Agency, DEFRA and DESNZ.

What are the key benefits?

What are the next steps?

# A low-carbon concrete solution for substation foundations

**Project name:**
EcoBuild 3D: Sustainable Substation Foundations

**Project number:**
NIA2_NGET0070

**Focus area:**
Enhance Sustainability

"This trial of low-carbon, 3D-printed alternatives to concrete for substation foundations is the first of its kind in the UK and has the potential to transform construction activities across the industry."

**Muhammad Shaban**
Lead Innovation Engineer


Photo credit: Hyperion Robotics

## Project overview

As electricity demand increases, there's a pressing need to build new infrastructure to upgrade the existing grid. Concrete is an important material – it's found in all our substation foundations, but it's also a major source of greenhouse gas emissions, accounting for 8% of global $CO_2$ emissions.

National Grid has a commitment to achieve carbon neutral construction by 2026. This innovation project investigates the potential to use an automated 3D printing technique to create substation foundations using low-carbon concrete. It's the first application of its kind anywhere in the UK energy sector.

**2026**
National Grid has a commitment to achieve carbon neutral construction by 2026

In partnership with Finnish specialist Hyperion Robotics and the University of Sheffield, we're developing and trialling a technique for substation foundations that will reduce the weight and volume of concrete used, cut carbon emissions, require less labour and speed up the construction process.

## How has the project progressed?

Working with Hyperion, we've selected lighting column foundations as the focal point for this project. These foundations have a low risk profile and are non-critical in case the design fails.

Using our specifications and construction drawings, Hyperion is 3D printing a total of 54 individual foundations, incorporating a geopolymer mix low-carbon concrete. The foundations are built in Finland, then shipped to the UK where they are due to undergo testing for serviceability at the University of Sheffield during summer 2025.

The next stage is further field testing at our Deeside Centre for Innovation, where the foundations will be available for demonstration. We're also looking at widening the types of substation foundations that could be 3D printed using what we've learned from this initial project. The scope will not be limited to only substation foundations but will focus on OHL foundations in the future.

## What are the key benefits?

# Boosting capacity through coordinated control

**Project name:**
Optimum Wide Area Power Flow Control Solutions

**Project number:**
NIA2_NGET0037

**Focus area:**
Build the Future Network

"Building a smarter grid for tomorrow, today! Projects like this are exciting because they enhance the power flow control capability of our network, boost our network capacity without new lines, and reduce constraints. This is paving the way for more clean energy to be integrated smartly and cost-effectively."

**Xiaolin Ding**
Lead Innovation Engineer

## Project overview

We've already installed Smart Wires' devices – what we call 'smart valves' – on several circuits in our transmission network. These devices help redirect power flows across the grid, providing us with greater control and flexibility to unlock our network capacity. Now, we're developing a coordinated approach to maximise the potential of these devices. Our goal is to boost the capacity of the existing network, especially at key boundaries where power moves between regions. By coordinating how these devices operate, we can carry more power and reduce the costs of managing constraints.

## How has the project progressed?

We built a detailed network model and carried out system studies to test where coordinating these devices would deliver real benefits. The results were promising, showing improved power flow and increased capacity at critical network boundaries. With this confirmed, we're now developing a coordinated control planning tool. This will help us determine which devices to operate, when, and how to optimise performance across the network.

## How have you involved stakeholders in this work?

The project involves close collaboration with our Network Planning team, who are focused on long-term system needs; Control Centre colleagues who operate the devices; and our technology partner for the project, Smart Wires, who bring experience from similar projects in Ireland.

What are the key benefits?

What are the next steps?

# Reshaping transmission with high-temperature superconductors

**SIF project name:**
Assessment of Superconducting Technologies for Standards Development

**SIF reference number:**
10128658

**NIA project name:**
Use Case and Market Development of Superconducting Technologies

**NIA reference number:**
NIA2_NGET0066

**Focus area:**
Build the Future Network

"High-temperature superconductors are a novel, exciting technology with enormous potential. They are not currently used for power transmission on the GB grid, and helping bring their adoption closer to reality is very rewarding."

**Ana Antelava**
Senior Innovation Engineer

## What's the story behind this project?

**Ana Antelava, Senior Innovation Engineer:** We are upgrading our existing infrastructure and building at a pace never seen before to enable us to connect more renewables to accelerate the transition to a clean energy system. That's driven by rising electricity demand from heating, transport and industry, alongside rapid growth in renewables and battery storage. The grid must be upgraded to carry more power, more efficiently, over longer distances.

High-temperature superconductors (HTS) can transmit huge amounts of electricity with almost no energy loss, but they're not currently used for power transmission on the UK electricity grid.

We're running two projects to explore how HTS could be safely and effectively introduced. One, funded by the Strategic Innovation Fund (SIF), looks at risks, technical barriers and a standards gap analysis. The other, funded by the Network Innovation Allowance (NIA), focuses on market potential, use cases and cost-benefit analysis. Together, they'll show how HTS could be part of the future grid.

## What progress have you made in the past 12 months?

**Hamid Shahrouzi, Innovation Engineer:** In the NIA project, we looked into the barriers to adoption and then moved on to find potential use cases. We did a detailed cost-benefit analysis and assessed the carbon impact of different technologies. We're working with Frazer-Nash

Consultancy, which is coordinating with technology providers to compare HTS with traditional cables and overhead lines. This involves comparing different technologies, like alternating current (AC) overhead lines and underground cables, as well as direct current (DC) terrestrial and marine cables, to see how their costs change based on power levels and line lengths.

**Ana:** For the SIF project, we recently completed the Alpha phase, including failure modes and effects analysis (FMEA) to understand what could go wrong and a standards gap analysis of HTS systems. This work fed into a roadmap showing what needs to change to make HTS viable on the future network.

## How have you involved stakeholders in this work?

**Ana:** We've brought together strong partners. Frazer-Nash Consultancy provided project management to the Alpha phase and systems engineering expertise; SuperNode specialises in DC superconducting cables; VEIR focuses on superconducting alternating current overhead lines; the University of Strathclyde led requirements analysis of HTS systems with respects to their deployment on the UK electricity grid; and the University of Manchester led a comprehensive review of standards.

## What are the key benefits?

## What are the next steps?

# Our Strategic Innovation Funding (SIF) projects

**We progressed five projects that were granted SIF funding of £9,588,394 during 2024/25. We were given the green light to progress project DELLTA and project HIRE to the first Discovery phase, while two of our projects – Assessment of Superconducting Technologies for Standards Development (read more on page 18) and LookNorthH2 – advanced to the Alpha phase of funding. Our $SF_6$ Whole Life Strategy project advanced to the Beta phase – a first for our business (read more on page 15).**

### LookNorthH2

Developing the infrastructure to allow energy from offshore-wind resource to reach consumers, whether electricity or hydrogen, is expensive, technically complex, creates system operability challenges and can be disruptive to communities.

This project explored the development of a standard framework to assess the impact of taking a cross-energy vector approach and co-locating assets offshore, including on artificial islands – with a view to addressing parts of challenges mentioned above and ultimately reducing costs to consumers.

### DEsign for Live Line Technology Acceleration (DELLTA)

This project explored designing the network to be live line inclusive. The project evaluated designs and technical specifications of high-voltage assets and infrastructure for potential redesign (or retrofit) to enable easier live line working.

**Sean Coleman**
Deeside Centre for Innovation and SIF Manager

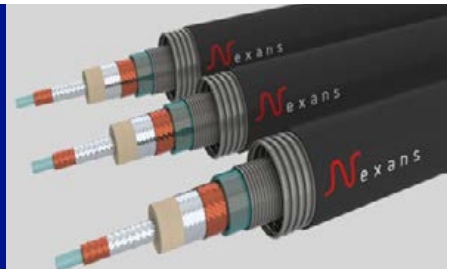
"These projects demonstrate how National Grid and its partners in industry and academia are tackling some of energy's biggest challenges with ambitious thinking."

**Funding through SIF**

# Our RIIO-T2 SIF project portfolio (NGET Led)

Find out more about our SIF portfolio by hovering over the icon for each project.

**SCADENT**




**Eye in the Sky**

**SEGIL**

**SCOHL**

**WELLNESS**

**$SF_6$ Whole Life Strategy**

**HIRE**

**HTS**

**LookNorthH2**

**DELLTA**

**KEY** Delivered · Rejected application · Not applied for · In-flight · Awaiting outcome of application

# Deeside Centre for Innovation (DCI)

**In 2015, we secured £12 million in funding through Ofgem's annual Electricity Network Innovation Competition (NIC), to create the Off-grid Substation Environment for the Acceleration of Innovation Technologies (OSEAIT) project.**

We combined this with an additional £31 million of National Grid investment to convert a decommissioned substation into a unique research and innovation facility – the Deeside Centre for Innovation (DCI).

## Progress during 2024/25

While we finalise work on the substation, our Deeside Centre for Innovation has continued to offer its facilities as a test ground for important innovation projects that don't require high voltage. We expect to complete the substation later this year.

The following projects were undertaken at DCI during 2024/25:

## 11kV cable fault pinpoint testing

DCI hosted testing of a sensor and software developed as part of National Grid Electricity Distribution's (NGED) NIA HV Pinpoint project. The aim of this project is to improve how faults on underground cables can be located, ensuring greater efficiency for excavation work. The tests at DCI were successful.

## Condition monitoring using robotics at substations

DCI also demonstrated how technologies such as Rajant wireless communication, SpotCamIR and sensors can be mounted on a robotic dog developed by Boston Dynamics. This work is part of our RAIDEDD project, which you can read about on page 12.

**First**

of its kind in Europe, the DCI is a state-of-the-art, off-grid testing facility.

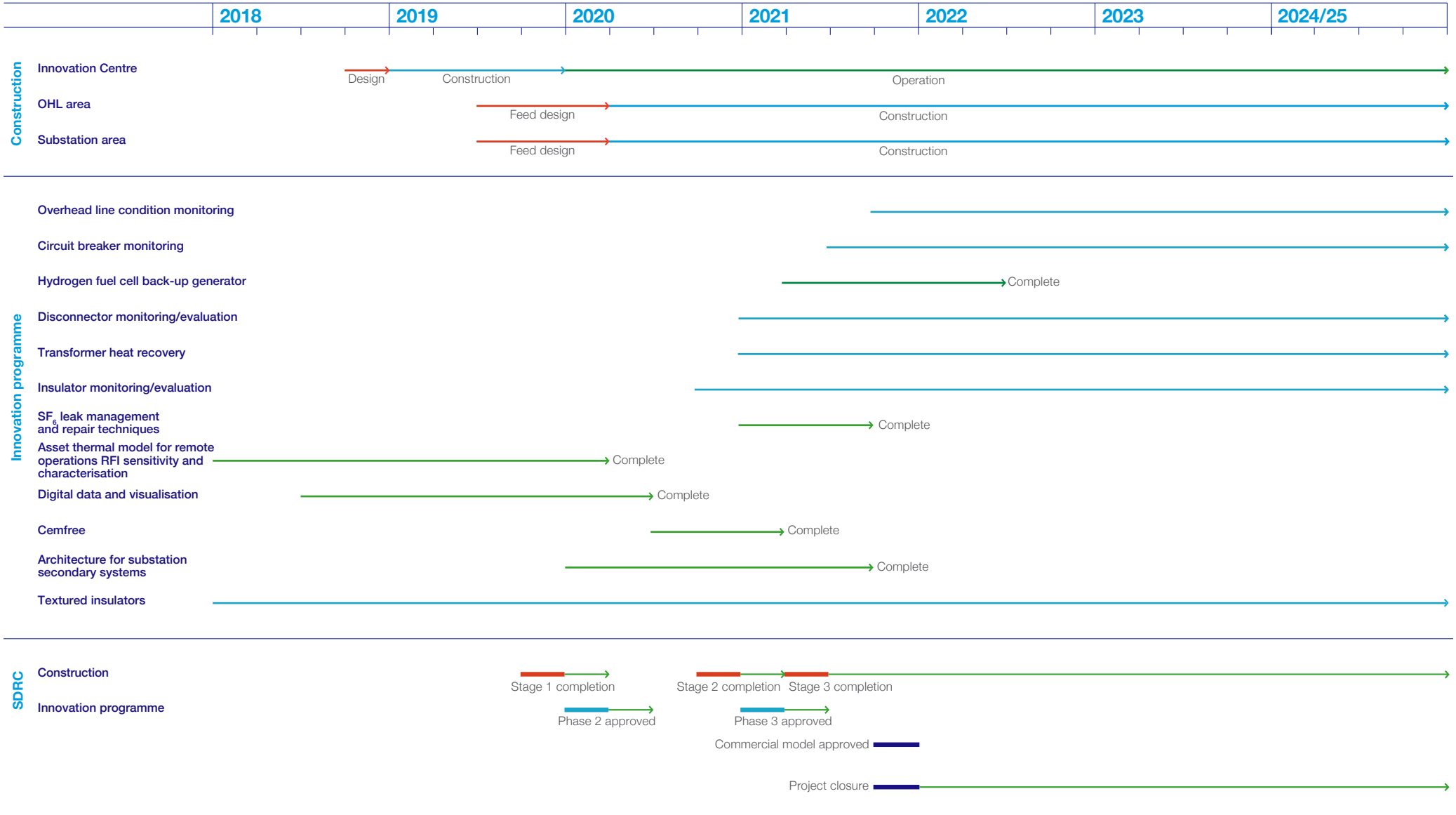
## Events

We presented DCI at the 2024 CIGRE in Paris and the 2024 Energy Innovation Summit in Liverpool, giving us the opportunity to promote its benefits to customers and stakeholders. The Energy Innovation Summit is the only event of its kind, designed to bring together the UK's energy networks, industry and energy system innovators.

**Did you know?**

# Deeside Centre for Innovation (DCI) continued

## Delivery Programme



# Deeside Centre for Innovation (DCI) continued

## Successful delivery reward criteria reference table

| Ref | Criteria | Description | Status |
|---|---|---|---|
| 9.1 | Formal agreement on Terms of Reference with Technical Advisory Board members | In order to achieve the efficiency required to meet the project's objectives, it is essential that the other Transmission Licensees fully engage in the Technical Advisory Board. An early indication that this project will succeed will be the Board agreeing the Terms of Reference. | Complete |
| 9.2 | Detailed design of the facility completed and approved | The completion of both the infrastructure and technical layout designs is an important milestone on the way to delivery of the overall project, as it will determine the level of testing and evaluation that can be carried out and at which stage. | Complete |
| 9.3 | Design, develop and publish internet site | One of the fundamental knowledge and dissemination channels for the project is the utilisation of the facility website, which will provide a secure area to share the outputs with the other Transmission Licensees. | Complete |
| 9.4 | Scope of work for the Phase 1 innovation programme approved | With there being a phased handover of assets, it is essential to the project's success that a detailed plan be put in place, based on the assets available and trials proposed during this phase. This plan will include costs of the proposed trial projects, the estimated benefits and justification for how the trials satisfy the Electricity NIC criteria. The plan will also include any NIA projects that are able to be undertaken at this time. | Complete |
| 9.5 | Completion of Stage 1 construction works | The completion of the Innovation Centre building renovation and the transfer of the protection and control panels to the telecoms and control room are key milestones to the effective functioning and monitoring of the facility. | Complete |
| 9.6 | Scope of work for the Phase 2 innovation programmes approved | The continuation of the phased handover of assets is essential to the project's success and a detailed plan is to be put in place, based on the assets available and trials proposed during this phase. This plan will include costs of the proposed trial projects, the estimated benefits and justification for how the trials satisfy the Electricity NIC criteria. The plan will also include any NIA projects that are able to be undertaken at this time. | Complete |
| 9.7 | Completion of Stage 2 construction works | The completion of the construction of the internal access road is a key milestone to the effective functioning of the facility, as this will enable the necessary vehicles to access all areas of the facility. Completion of the OHL test area is a key milestone to deliver the innovation programme for OHL technologies. | Complete |
| 9.8 | Scope of work for the Phase 3 innovation programme approved | The continuation of the phased handover of assets is essential to the project's success, as is having a detailed plan in place, based on the assets available and trials proposed during this phase. This plan will include costs of the proposed trial projects, the estimated benefits and justification for how the trials satisfy the Electricity NIC criteria. The plan will also include any NIA projects that can be undertaken at this time. | Complete |
| 9.9 | Commencement of Phase 3 innovation programme | The delivery of the innovation programme testing and evaluation is a key milestone within the project and the ability to commence operations at the facility is fundamental to the measurement of its success. | Jan-26 |
| 9.10 | Completion of Stage 3 construction works | The completion of the construction of the substation area is a key milestone to the effective functioning of the facility, as this will enable the delivery of high voltage equipment testing and evaluation projects. | Jul-26 |
| 9.11 | Approval of model for enduring facility | The Technical Advisory Board will determine, based on the flow of projects, the future of the facility. | Complete |
| 9.12 | Project close down | All project learning will be consolidated and disseminated appropriately. | Oct-26 |

# Retrofit Insulated Cross Arms (RICA)

**Our Retrofit Insulated Cross Arms (RICA) project is a NIC project. It aims to find innovative ways to deliver network capacity – providing increased value for money to consumers and accelerating the drive towards a low-carbon future.**

Insulated cross arms replace the standard metallic cross arms from which insulators and conductors are attached and/or suspended. Retrofit insulated cross arms enable network owners to upgrade the voltage rating on their existing towers from 275kV to 400kV, which has the potential to increase transmission capacity by more than 40%.

The project provides a pathway for Britain's first full-scale implementation of RICA technology, by mitigating technology risks and accelerating its adoption onto the network.

Using RICA could decrease emissions through avoiding use of steel and concrete required for new Overhead Line (OHL) builds, potentially delivering a 39kt reduction of net carbon emissions by 2050.

## Benefits

RICAs can provide new network capacity without the need for new build OHLs. This leads to shorter project timeframes, reducing constraint costs earlier (saving £180 million per year) and enabling faster connection of renewable generation. The capability to operate at higher voltages also means lower losses and associated emissions.

Wider benefits to stakeholders include reduced customer impact due to lower construction volumes and better visual amenity of towers compared to new build alternatives.

## Collaborative approach

Through our innovation collaboration with insulator manufacturer Shemar and overhead line contractor Wood, we've progressed the RICA project over the past year.

## RICA progress

We shared and promoted RICA's innovative technology by presenting a paper at the CIGRE Conference at Paris in 2024. We also participated in a new International Electrotechnical Commission (IEC) working group created to define, design and establish test methods and acceptance criteria for composite insulated cross arms.

At our Eakring Global Technical Training Centre of Excellence, we constructed a six-pylon, reduced-height RICA development overhead line, as well as developing and demonstrating installation and maintenance procedures to stakeholders. Eakring also hosted demonstration and dissemination events for stakeholders.

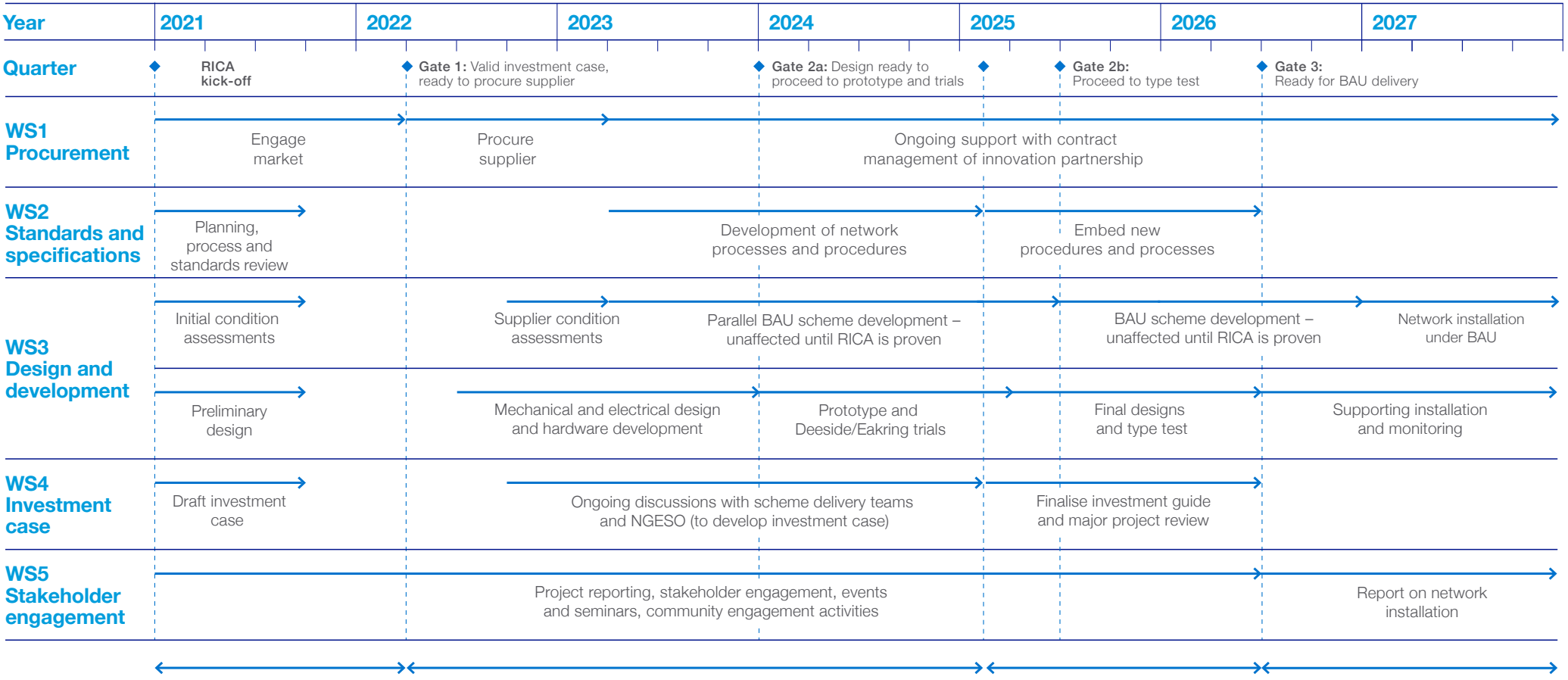
RICAs being constructed at Eakring.

**Jimmy Deas**
Senior Innovation Engineer

"We are delighted to be moving on to the next stage of this complex and challenging project, and while new overhead lines will still be required in many areas, this early-stage innovation project has the potential to deliver a wealth of benefits in terms of extra energy supply."

# Retrofit Insulated Cross Arms (RICA) continued

## Delivery Programme




**Stage 1**

NGET project team will engage with wider business, framework service providers and universities, and potential RICA suppliers

**Stage 2a**

NGET project team will work with chosen supplier and alongside the wider business departments to develop, de-risk and ready the technology design and the investment option

**Stage 2b**

Final designs and type testing

**Stage 3**

NGET project team will support the wider business and witness the implementation of RICA on the networks as BAU

# Retrofit Insulated Cross Arms (RICA) continued

## Successful delivery reward criteria reference table

| Ref | Criteria | Description | Status |
|---|---|---|---|
| D.S1.1 | Detailed requirement definition | • Report consisting of all the information required for potential suppliers to accurately gauge the level of work that will be involved in Stage 2<br>• Shared with licensees through TAB. | Delivered 01 Jul-21 |
| D.S1.2 | Preliminary investment case | • Report on the preliminary investment case<br>• Shared with licensees through TA<br>• Workshop with TAB members to review benefits from technology on their networks. | Delivered 01 Jul-21 |
| D.S2a.1 | Draft functional specification | • Draft functional specification<br>• Workshop with stakeholders to incorporate feedback into specifications<br>• Disseminated through TAB. | Delivered Mar-24 |
| D.S2a.2 | First generation product design portfolio | • RICA designs for first generation<br>• Workshop with stakeholders to review impact of different design choices on investments and applications<br>• Disseminated through TAB. | Oct-25 |
| D.S2a.3 | Report detailing trial outcomes and lessons learned | • Report on hardware trials of RICAs<br>• Evidence of workshops and lessons learned from trials<br>• Non-confidential information disseminated through industrial conference or journal<br>• Report disseminated to licensees through TAB. | Dec-25 |
| D.S2b.1 | NGET processes and procedures for RICA | • Updated technical specifications<br>• Guidance note on rationale behind specification<br>• Guidance on investment case development<br>• Installation practices recorded in report<br>• Disseminated to licensees through TAB, and non-confidential information through industrial conference or journal paper. | Feb-26 |
| D.S2b.2 | Detailed uprate methodology (final investment case) | • Report on scheme delivery plan and methodology<br>• Disseminated through TAB to licensees<br>• Final guidance on investment case development<br>• Non-confidential learnings disseminated through industrial conference or journal paper. | Jan-26 |
| D.S2b.3 | Full suite of documentation issued | • Final technical specifications published<br>• Final guidance note on rationale behind specification<br>• Final installation practices recorded in report<br>• Materials disseminated through TAB. | Mar-26 |
| D.S3.1 | Enhanced stakeholder engagement | • Record of RICA engagement with stakeholders<br>• Materials for stakeholder engagement posted publicly. | Mar-26 |
| Common | Comply with knowledge transfer requirements of the Governance Document | • Annual Project Progress Reports which comply with the requirements of the Governance Document<br>• Completed Close Down Report which complies with the requirements of the Governance Document<br>• Evidence of attendance and participation in the Annual Conference as described in the Governance Document. | Mar-26 End of development |

# Live NIA project portfolio

| NGET Led | | |
|---|---|---|
| **Project Ref.** | **Name** | **Collaborators (includes suppliers, partners and supporters)** |
| **NIA2_NGET0001** | Impedance Scan Methods | Cardiff University, ESO |
| **NIA2_NGET0002** | Role and value of electrolysers in low-carbon GB energy system | I C CONSULTANTS LIMITED, ESO, NGGT |
| **NIA2_NGET0003** | Retrofitting Oil Source Heat Recovery to Transformers | Therma-Mech Ltd, The University of Manchester, SSE Energy Solutions |
| **NIA2_NGET0004** | Centralised PAC | UK Grid Solutions Limited |
| **NIA2_NGET0005** | Environmental Risk and Assurance (ERA) | Frazer-Nash Consultancy Limited, University of Liverpool, Previsico Limited, Energy Innovation Centre Limited (EIC) |
| **NIA2_NGET0006** | Non-invasive In-situ Monitoring and Interpretation of $SF_6$ Alternatives in GIS Equipment | The University of Manchester |
| **NIA2_NGET0007** | EPRI Research Collaboration on Electric & Magnetic Fields Health & Safety (P60) 2021-25 | EPRI |
| **NIA2_NGET0008** | EPRI Substations (P37) and Analytics (P34) 2021-2025 | EPRI |
| **NIA2_NGET0009** | Visual Inspection and Condition Assessment Platform for OHL Steelwork (VICAP) | Keen AI, sees.ai |
| **NIA2_NGET0010** | Non-intrusive Tower Foundation Inspections using UGW (NITFI) | The Welding Institute Ltd (TWI) |
| **NIA2_NGET0011** | Alternative Approaches to Tower Painting Preparation | Hive Composites Ltd |
| **NIA2_NGET0012** | EPRI Research Collaboration on Underground Transmission (P36) 2021-2025 | EPRI |
| **NIA2_NGET0013** | Overhead Line Sagging Monitoring Using 5G Signals | University of Warwick |
| **NIA2_NGET0014** | Secure Edge Platform | Capula Ltd |
| **NIA2_NGET0015** | Fibre Health Monitoring | EXFO Europe Limited and ADVA Optical Networking Ltd |
| **NIA2_NGET0016** | Novel methods for sealing $SF_6$ leaks | Rawwater Applied Technology Limited, The University of Manchester, Cardiff University, SPEN, SSEN Transmission, EIC |
| **NIA2_NGET0017** | System value from V2G peak reduction in future scenarios based on strategic transport and energy demand modelling | Frontier Economics, Imperial College, University of Warwick |
| **NIA2_NGET0018** | Autonomous Aerial, Thermal Inspections of Substations | Frazer-Nash Consultancy, HEROTECH8 |
| **NIA2_NGET0019** | Aerial E-field Inspection System for Live Overhead Transmission Assets | The University of Manchester |
| **NIA2_NGET0020** | Co-Simulation | Manitoba Hydro International, SPEN, SSEN, NGESO |

# Live NIA project portfolio continued

| NGET Led | | |
|---|---|---|
| **Project Ref.** | **Name** | **Collaborators (includes suppliers, partners and supporters)** |
| **NIA2_NGET0021** | New online tools for Assessment of Bushing Condition | Doble PowerTest |
| **NIA2_NGET0022** | Switch Oil Markers | The University of Manchester, Nynas Limited |
| **NIA2_NGET0023** | Cable Alternative Cooling Technologies for Underground Systems (CACTUS) | University of Southampton |
| **NIA2_NGET0024** | Insulating Dielectrics: Esters & Alternative Liquids | University of Southampton |
| **NIA2_NGET0025** | Wide Area Control Framework | Siemens Public Limited Company |
| **NIA2_NGET0026** | Energy water nexus | Energy Systems Catapult, PSC |
| **NIA2_NGET027** | Enhance Power Flow Control Capability of GB Network | University of Exeter, ESO |
| **NIA2_NGET0028** | Identification and quantification of C4F7N gas arcing by-products and their implication for GIS operation | Cardiff University |
| **NIA2_NGET0029** | Silicone Oil Diagnostics: Marker Investigation | Arup |
| **NIA2_NGET0030** | Voltage Interaction and Thermal Dynamics of Tertiary Connection | EA Technology |
| **NIA2_NGET0031** | Understanding the Whole System Impacts of Nuclear Co-Generation on Electricity Transmission Infrastructure | Ove Arup & Partners Ltd, The University of Manchester, SPEN, SSEN, The National HVDC Centre |
| **NIA2_NGET0032** | Swarfless Cut Isolation System for $SF_6$ Outages and Repairs (SCISSORs) | The University of Manchester |
| **NIA2_NGET0033** | Digital Twin Enabled Innovation for Network Restoration | ESC, ESO |
| **NIA2_NGET0034** | VoltXpanse: Ultra high voltage onshore energy highway | Arup, SGN |
| **NIA2_NGET0035** | Green Heat for Local Communities | NLB Engineering |
| **NIA2_NGET0036** | Grid forming modelling and stability | Cardiff University, ESO |
| **NIA2_NGET0037** | Optimum Wide Area Power Flow Control Solutions | Smart Wires |
| **NIA2_NGET0038** | Network Intelligence through Probabilistic Risk Assessment Methodology (NIPRAM) to improve electricity system restoration | Aerospace Technical Services, NGED, UKPN |
| **NIA2_NGET0039** | Characterisation and Optimisation of Battery Banks in Substations (COBBS) | Cardiff University |
| **NIA2_NGET0040** | Surge Arrestors Health Assessment by Monitoring Partial Dscharge (SAHARA) | EA Technology, The University of Manchester |
| **NIA2_NGET0041** | Wet Weather Data for OHL Noise Predictions | Met Office |

# Live NIA project portfolio continued

| NGET Led | | |
|---|---|---|
| **Project Ref.** | **Name** | **Collaborators (includes suppliers, partners and supporters)** |
| NIA2_NGET0042 | Analysis of the Thermal Influence of Cable Surroundings (AnTICs) | University of Southampton, Ørsted |
| NIA2_NGET0043 | Aerial inspections of OHLs from Beyond Visual Line of Sight (BVLOS) | sees.ai |
| NIA2_NGET0044 | Improving the determination of safety and induced effects in earthing systems | Cardiff University |
| NIA2_NGET0045 | Use of Innovative Materials and Construction Techniques in the Substation Environment to Accelerate Transition to Net-Zero | Kelvin Construction Company Limited |
| NIA2_NGET0046 | CrystalClear - Lifecycle Analysis of $SF_6$ Alternative Technologies and Crystal Formation Impacts | University of Manchester, EPRI |
| NIA2_NGET0047 | Cable Oil DEcontamination by BaCteria (CODEC) | BioNRec |
| NIA2_NGET0048 | Visual Inspection and Condition Assessment Platform for OHL Steelwork 2 (VICAP 2) | DSCIENCE LTD (Trading As KEENAI) |
| NIA2_NGET0049 | Sprayed Metal for Effecting Leaking Transformer Repairs (SMELTeR) | Rawwater Engineering Company Limited |
| NIA2_NGET0050 | Condition Assessment of Long Interconnected Cable Systems (CALICS) | University of Southampton, Ørsted |
| NIA2_NGET0051 | Interaction of Megawatt e-Trucks with Transmission System (I-MeTTS) | Cardiff University, NGED, ESO |
| NIA2_NGET0052 | Detailed Analysis of Transformer Ageing Mechanisms for Intelligent Estimation of Reliability - DATAMInER | The University of Manchester, University of Southampton |
| NIA2_NGET0053 | Optimise Fault Infeed | ESO, SPEN |
| NIA2_NGET0054 | Electricity Transmission Heat Effects, Resilience Measures to Manage Asset Lifecycles (THERMAL) | TNEI Services Limited, Frazer-Nash Consultancy Limited, University of Edinburgh, SSEN-T, NGED |
| NIA2_NGET0055 | Knowledge Elicitation of Risks to Assets Under lightNing Impulse Conditions (KERAUnIC) | University of Bath, NGED |
| NIA2_NGET0056 | BRIDGES - Building a Resilient and Intelligent Dynamic Grid Enhancement System | GE Vernova |
| NIA2_NGET0057 | Understanding the impact of Electromagnetic Fields from Interconnectors (BLUEFIN) | University of Southampton, SSE |
| NIA2_NGET0058 | HVDC Assets Life Cycle Assessment (HVDC - LCA) | DNV Services UK Limited, SPEN, SSEN |
| NIA2_NGET0059 | Anticipating Gas Insulation Leaks from Electrical assets- AGILE | Elimpus Limited, University of Strathclyde, EPRI |
| NIA2_NGET0060 | Robot, AI and Drone Enhanced Detection of Discharge (RAIDEDD) | Cardiff University, Chronos Technology Limited, University of Strathclyde, Elimpus Limited |

# Live NIA project portfolio continued

| NGET Led | | |
|---|---|---|
| **Project Ref.** | **Name** | **Collaborators (includes suppliers, partners and supporters)** |
| NIA2_NGET0061 | Tunnel power cables earthing, safety and protection under electromagnetic transient voltages and currents (TunCab) | Cardiff University |
| NIA2_NGET0062 | Compact Substation (CoSub) | Cardiff University |
| NIA2_NGET0063 | intercompatible CAble REpair (iCARE) | The University of Manchester |
| NIA2_NGET0064 | New Aspects of Trading to Understand Risks to the Environment (NATURE) | EIC |
| NIA2_NGET0065 | High Security Control and Protection System | Admeritia GMBH |
| NIA2_NGET0066 | Use Case & Market Development of Superconducting Technologies | Frazer-Nash Consultancy |
| NIA2_NGET0067 | Investigating Coastal and Estuarine Climate Risks on Electricity Asset Management (ICECREAM) | EIC |
| NIA2_NGET0068 | AIDPS: Assessing the Impacts of DC Components from Power Electronic Devices and Geomagnetically Induced Currents | University of Birmingham |
| NIA2_NGET0069 | Sustainable Drainage Systems (SuDS) for Hydrocarbons | Arup Ltd |
| NIA2_NGET0070 | EcoBuild 3D: Sustainable Substation Foundations | Hyperion Robotics |
| NIA2_NGET0071 | Digital whole life carbon assessment (DgWLCA) | Mott MacDonald |
| NIA2_NGET0073 | Graphene Enhanced Maturity Site Trials and Optimal Network Evaluation (GEMSTONE) | Frazer-Nash Consultancy |
| NIA2_NGET0075 | Framework for Risk Analysis and Modelling of Events (FRAME I) | Baringa Partners LLP |
| NIA2_NGET0076 | Thermal Analysis and Consequences of Thermosyphon Installations on Cable (TACTICS) | University of Southampton |
| NIA2_NGET0077 | intercompatible CAble REpair (iCARE) 2 | The University of Manchester |
| NIA2_NGET0078 | Earth Friendly Concrete Trials – Tunnel Linings | HMJV |
| NIA2_NGET0079 | Fibre Health Monitoring Phase 2 | Adtran Networks SE |
| NIA2_NGET0080 | Visual Inspection and Condition Assessment Platform (VICAP3) - Bar by Bar | DSCIENCE LTD (Trading As KEENAI) |
| NIA2_NGET0081 | AssetCool | Cable Coatings Limited (Trading as AssetCool) |
| NIA2_NGET0084 | Low-carbon STrategic REplacement with Additive Manufacturing (L-STREAM) | The University of Manchester |
| NIA2_NGET0085 | Track to Zero | University of Leeds |

# Live NIA project portfolio continued

| RIIO-T2 Collaborative Projects | | |
|---|---|---|
| **Project Ref.** | **Name** | **Collaborators (includes suppliers, partners and supporters)** |
| **NIA_WWU_2_06** | Consumer Vulnerability Impact Assessment Tool | Wales and West Utilities, SIRIO |
| **NIA2_NGESO0014** | A Common Framework for a Virtual Energy System | Arup are leading a consortium which will deliver the project, with Energy Systems Catapult and Icebreaker One as consortium members working alongside Arup. |
| **NIA2_NGESO026** | Consumer Building Blocks | NESO, SSE |
| **NIA_SHET_0035** | TOTEM (Transmission Owner Tools for EMT Modelling) Extension | Led by SPEN |
| **NIA_SHET_0039** | OHL Foundation Uplift | Led by SSEN |
| **NIA2_NGESO040** | DETECTS II | Transmission Excellence Ltd |
| **NIA_SPEN_0064** | Cyber Security for Active and Flexible Energy Networks (Cyber-SAFEN) | Led by SPEN. Partner: University of Manchester, Energy Innovation Centre |
| **NIA_SPEN_0066** | Predict4Resilience - Discovery Continuity | SP Energy Networks, SIA Partners Ltd |
| **NIA_SPEN_0077** | Truly Sustainable D&T Substations | SP Energy Networks, CEE |
| **NIA2_NESO084** | Alternative approaches to the ORPS methodology | Led by NESO |
| **NIA_SPEN_0084** | Transformer Research Consortium – Phase 5: Future-proof Transformers in a Digital Twinning and Net-Zero World | The University of Manchester, EPRI, SGB-SMIT, Shell, Weidmann |
| **NIA_CAD0088** | Digital Exclusion | Led by Cadent. Partner: Frazer-Nash Consultancy, Energy Innovation Centre |
| **NIA_SPEN_0090** | Cyber Risk Impact Assessment (Cyber-RIAST) | Led by SPEN. Partner: The University of Manchester |
| **NIA_NGGT0175** | 5G – The art of the possible | Led by National Gas Transmission. Partner Digital Catapult |
| **NIA_NGGT0184** | Gas and electricity transmission infrastructure outlook | Led by National Gas Transmission. Partner: Guidehouse |

# SIF project portfolio

| RIIO-T2 Strategic Innovation Funding | |
|---|---|
| **Project Ref.** | **Name** |
| **10027601** | SCADENT - Super Conductor Applications for Dense Energy Transmission |
| **10037761** | SCADENT - SuperConductor Applications for Dense Energy Transmission |
| **10027585** | Eye in the Sky - Application of satellite data to improve grid resilience |
| **100374939** | Eye in the Sky – Utilising satellite data to improve grid resilience |
| **10027503** | SEGIL - Sustainable Electrical Gas Insulated Lines |
| **10061159** | SCOHL |
| **10061033** | Whole Energy System Resilience Vulnerability Assessment (WELLNESS) |
| **10084557** | Whole Energy System Resilience Vulnerability Assessment (WELLNESS) |
| **11061098** | $SF_6$ Whole Life Strategy |
| **10084569** | $SF_6$ Whole Life Strategy |
| **TBC** | $SF_6$ Whole Life Strategy Beta |
| **10103531** | HIRE - Hybrid Network Improvement and Reliability Enhancement |
| **10128658** | Assessment of Superconducting Technologies for Standards Development |
| **10131011** | LookNortH2 |
| **10145555** | DEsign for Live Line Technology Acceleration (DELLTA) |

# Contact us

We'd really like to hear from you – our communities, consumers, customers, employees, investors and stakeholders. We want to make sure we're focusing on the right areas and delivering the right results.

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