



**Electricity
Distribution**

Innovation Annual Summary

2025/26

nationalgrid

Welcome

Welcome to our Innovation Annual Summary 2025/26. This has been a year of brilliant work, and the start of something much bigger.

Our innovation mission has always been simple: **deliver measurable impact for our customers.**

This year that mission has delivered some of our proudest moments yet: for example, projects that spot faults before customers notice them.

We’ve unlocked capacity to accelerate new connections, and worked in partnership with local authorities, other network operators and regional stakeholders to plan and shape the energy transition. This report also looks at where we go from here.



The work in this report is the springboard for our boldest ambitions yet.

The energy system is changing at extraordinary pace, and the whole industry has come together through the Energy Networks Innovation Taskforce to define the five innovation challenges that will shape the networks of the future. We intend to lead the way in meeting them.

In these pages you will find the showcase of a brilliant year: the projects, the people and the results. You will also find our direction of travel, and the scale of our ambition for the years ahead.

We are proud of what our teams and partners have achieved this year. We are even more excited about what comes next.

Emily Spearman
Director of Innovation



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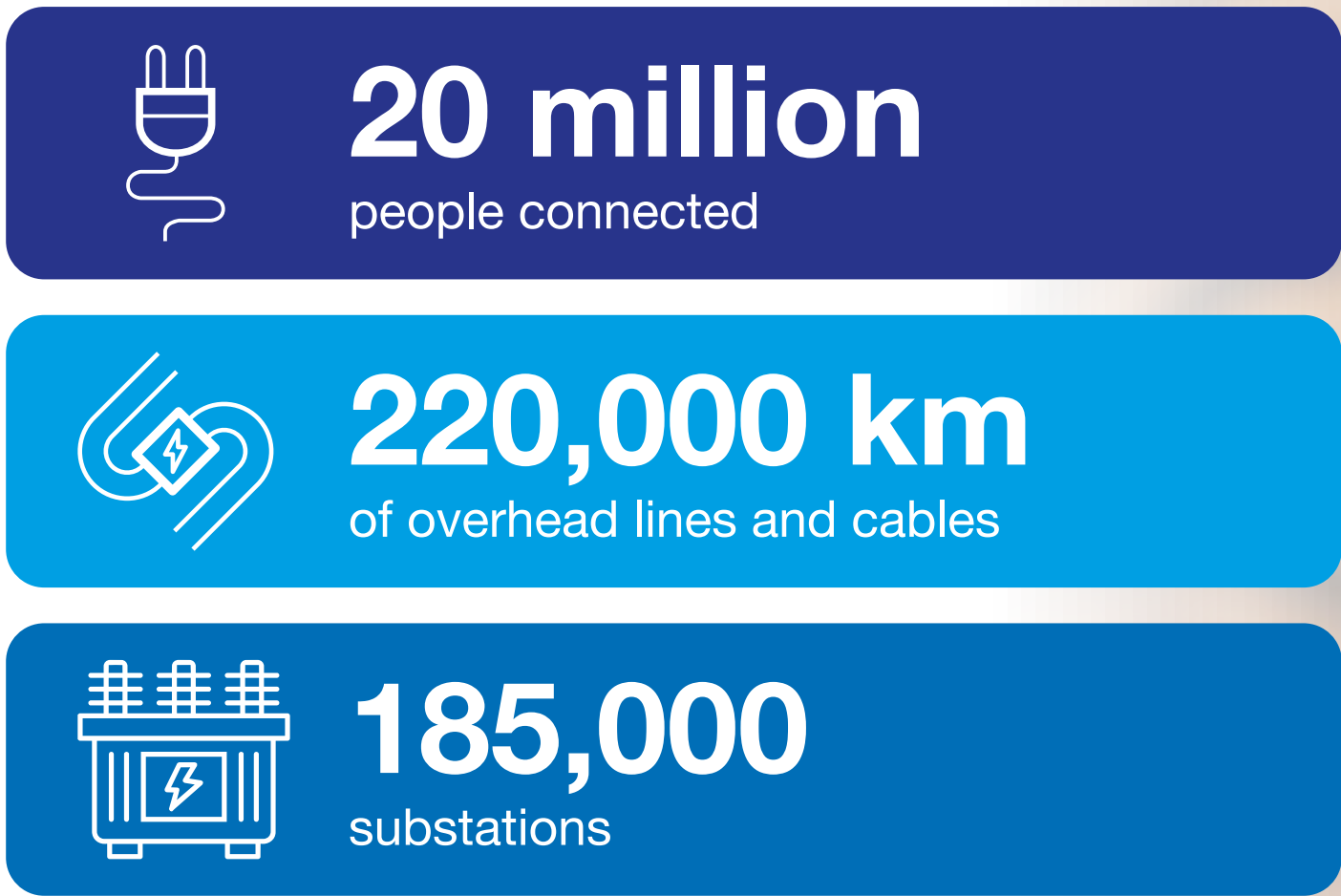
We bring energy to life for 20 million people across the South West of England, South Wales and the Midlands.

Our 7,200-strong team keeps electricity flowing safely and reliably across 55,500 square kilometres, from the Isles of Scilly to Cardiff to Lincolnshire, making us geographically the largest electricity distribution network in the UK.

Our network of overhead lines, underground cables and stations transform the 400,000 volts supplied by National Grid Electricity Transmission down to the 230 volts that power homes and businesses every day.

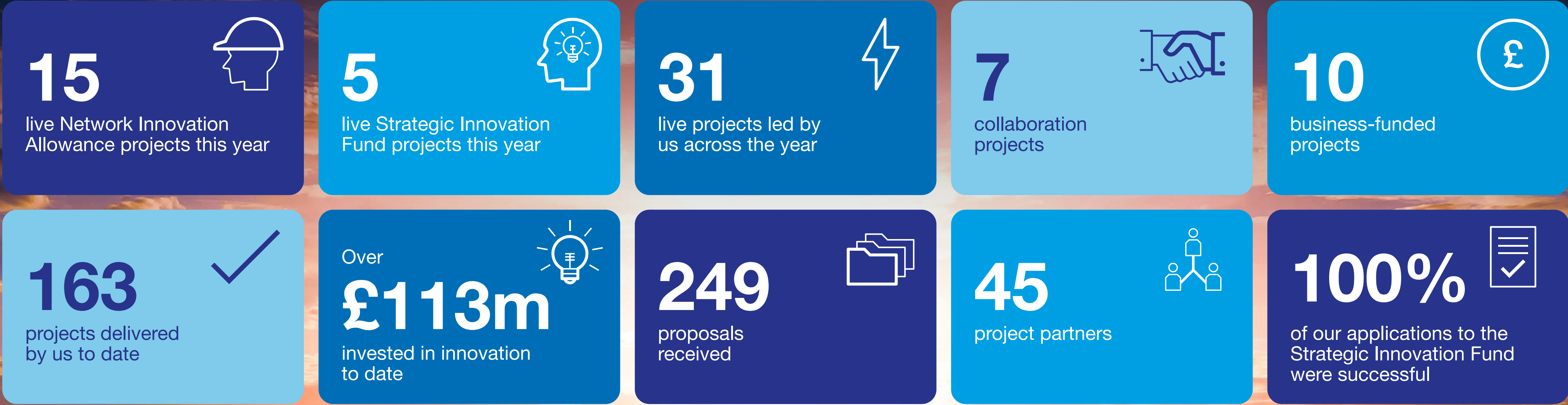
Through our innovation work we are accelerating the transformation of our network: developing new ways to operate our assets, trialling smart technologies and helping all our customers take part in the energy transition.

By the numbers



Our achievements

Here are some of the highlights from the last 12 months (April 2025 to March 2026): a snapshot of our progress and reach across live projects, partners and investment.



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Our strategy, values and focus areas

Times are changing, and so are we. This year marks a turning point for innovation across the energy networks, and we are determined to lead it.

In May 2026 the Energy Networks Innovation Taskforce, working with more than 250 stakeholders from across the industry, set out five bold, outcome driven innovation challenges for the years ahead, endorsed by Ofgem.

These challenges define priorities for the industry and wider energy sector.

We have made a clear decision: we are adopting them, aligning to them and helping to deliver them as our own.

Our existing focus areas evolve naturally into the five challenges. The projects in this report reflect that continuity. What changes is the scale of our ambition: a step change in how the network is planned, designed, built, operated and experienced by customers. Our intention is to redefine what innovation means within the sector and lead the transformation of the UK's electricity distribution network.

Our purpose remains constant.

Every project in our balanced portfolio is there because it adds value for customers, whether that is a more reliable supply, a faster connection or a lower cost network.

We test, we measure, we scale what works and we share what we learn to accelerate progress across the industry. Through our Living Innovation programme we are bringing senior leaders from across the industry together to turn shared challenges into coordinated action.

Each project in the pages that follow is tagged to the challenge it serves, so you can follow the thread from this year's results to the network of the future.

The industry has set its innovation challenges. We are making them our own.



Statement of intent



National Grid Electricity Distribution is redefining innovation across the energy system to meet customer needs.

We are doing this by partnering with forward-thinking innovators and disruptive challengers to turn **bold ideas into meaningful value for the customers we serve.**

By living innovation, we deliver measurable impact, drive growth, enable performance, and power possibilities to unlock the big shifts needed to build a world-leading distribution network.

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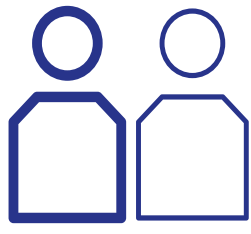
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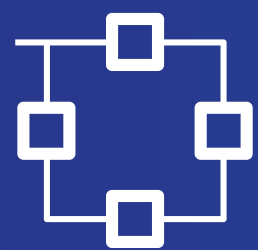
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Our challenges

Five challenges. One goal: a network that delivers for customers and growth. Our customers and stakeholders spoke, and we listened, focusing our innovation where it matters most for them. Here is what each challenge means, and how we are approaching it.

Developed with **250 stakeholders** 
Endorsed by Ofgem. Adopted as our own.



01

Industrial and business connection acceleration

Delivering timely, faster connections by co-creating solutions with customers, making the most of existing network headroom, creating more options for connecting, and continuing to develop flexibility markets and curtailment options.



02

Faster build and maintenance

Transforming how we design and build the network through standardisation, modularisation, prefabrication, digitalisation and automation, developing new ways of working with our supply chain, and using advanced analytics on asset health, faults and maintenance.



03

Instant use domestic energy devices

Making our network ready for low carbon technology before domestic customers realise they need it, through innovation in customer journeys, forward planning of our local networks, and local partnerships.



04

Eliminating energy outages

Improving reliability and resilience through new network design approaches and materials, enhanced network and asset monitoring, smarter remote switching and fixing, and more accurate pinpointing of faults with faster response.



05

Decentralised system balancing

Optimising the system at a local level: understanding and defining our safe operating envelope, building network visibility including digital twins, exploring transmission and distribution boundary options, and developing new market structures to support local optimisation.

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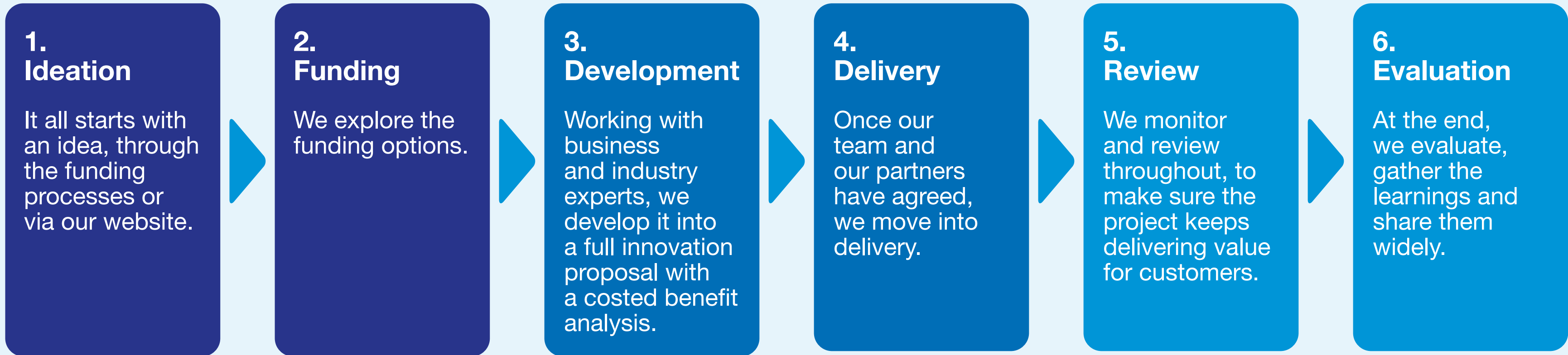
From idea to impact

Great innovation rarely happens alone.

We work with partners from academia, the private and public sectors, non-profit organisations and fellow GB network operators to test the ideas that will meet the needs of the future, and to bring proven technologies into business as usual where they can benefit customers now.

Our projects range from small, short studies exploring a new idea to large, multi-year programmes.

The process



Where there is clear benefit, successful ideas go on to further work or scale up across the business, delivering long-term value for our customers.

Innovation funding

Alongside our own funding, Ofgem supports wider network innovation through several streams. We have invested over £113 million as a business in this work, testing and delivering solutions that keep our services affordable, reliable and efficient.

Network Innovation Allowance (NIA)

The NIA was introduced under the RIIO-1 price control. It funds projects that address consumer vulnerability or support the energy system transition, delivering longer-term financial and environmental benefits for customers.

Strategic Innovation Fund (SIF)

The SIF backs larger-scale innovation to transform the gas and electricity networks for a low-carbon future, with projects moving through three stages: Discovery (feasibility), alpha (experimental development) and beta (build, operate and demonstrate).

Network Innovation Competition (NIC)

The NIC was a funding mechanism used from 2015 to 2023, an annual competition across all UK electricity network operators to fund larger-scale, higher-value projects. EQUINOX was our last project approved under it.

Business funding

We use our own investment to trial and roll out new technologies, often building on ideas already proven in earlier projects, including those pioneered by other networks.

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Innovation in action



The pages that follow showcase innovation in action: a selection of the projects we have been working on this year.

You will find ideas that have already become standard practice, projects funded through the Network Innovation Allowance and the Strategic Innovation Fund, and projects where we are lending our expertise to support other networks.

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Unlocking whole-system collaboration through shared digital intelligence

Funding stream:
Strategic Innovation Fund

Challenge alignment:
Industrial and business connection acceleration

Project stage:
Beta phase

End date:
October 2027

Decarbonising a region only works when everyone is working from the same picture. Our Planning Regional Infrastructure in a Digital Environment (PRIDE) project is building a digital tool and the governance to make that happen, so the network is ready for our customers before they need it.

PRIDE has two parts. The first is a digital planning platform, LAEP+, developed with Advanced Infrastructure Technology Limited. It helps local authorities turn their local decarbonisation ambitions into live, shareable data, mapping how they want to decarbonise their area, from switching home heating to heat pumps to rolling out EV charge points, in a format that can be used for energy planning. The second part, and the focus of this phase, is governance: testing the working groups, structures and information flows needed for local plans to move smoothly into regional planning, and for everyone to be clear on how decisions are agreed when plans have to be reconciled.

Our main governance trial is taking place in the West Midlands, with the West Midlands Combined Authority as a partner.

We are also working with Oxfordshire, where the county is served by three different networks and coordination is especially complex, and comparing with Wales, where authorities are further ahead thanks to government-funded local energy plans.

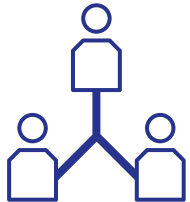
PRIDE is in its beta phase, with the governance trial getting under way later this year and a roadmap already taking shape for how a proven approach moves into business-as-usual, tracked throughout to make sure it delivers value for money.



In collaboration with:
Advanced Infrastructure Technology Limited and West Midlands Combined Authority.



Customer benefit:
Future-ready network



Planning the network around the places and people it serves, so the capacity is there when our customers need it

“The goal for this project is simple, and it comes back to our customers: a network planned around the places and people it serves, so that when a community is ready to decarbonise, the power is already there.”

Lizaveta Troshka
Innovation Engineer



Read more on the ENA's Smarter Networks Portal



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Data driven phase visibility for smarter network interventions

Funding stream:
Network Innovation Allowance

Challenge alignment:
Instant use domestic energy devices

Project stage:
Research

End date:
June 2026

HV Pilot is lifting the lid on a long-standing blind spot in our rural network, and it could unlock capacity we did not know we had, without an expensive manual data-capture programme.

Much of the rural network relies on overhead 11kV power lines, with pole-mounted transformers reducing the voltage to safely supply electricity to homes and businesses. Over time, due to changes in customer connections, more transformers are connected, and electricity demand may become unevenly distributed along the HV circuits. This can leave spare capacity available on some HV phases while others become more heavily loaded.

HV Pilot uses two innovative approaches to identify these phase connections remotely. Firstly, by comparing smart meter voltage signatures with those from a reference substation. A second method uses machine vision techniques applied to aerial imagery already collected during network inspections. Both methods can be combined to improve HV phase identification confidence and accuracy.

Early findings are identifying opportunities to make better use of existing infrastructure. By providing a clearer picture of network connectivity, HV Pilot could help to reduce voltage-related issues, lower network losses, support faster connections for low-carbon technologies such as electric vehicles and heat pumps, and defer unnecessary reinforcement works. Initial assessments suggest potential benefits of £2.5–£2.8 million per year across NGED’s four licence areas if the approach is adopted operationally.

This project has proved the method on an initial sample of HV feeders. The next step is to scale the approach across a much larger portion of the network and explore how identified imbalances can be addressed.

By turning existing data into actionable insight, HV Pilot is demonstrating how innovation can unlock capacity.



In collaboration with:
CGI UK Ltd. and Loughborough University.



Customer benefit:
Reduced interruptions

“There is capacity hiding in plain sight on the network we already have. We have proved we can find it. Now we need to scale up the HV Pilot approach, and then do something about it.”

David Penfold
Innovation Engineer



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Creating a higher-capacity superhighway for future connections

Funding stream:
Network Innovation Allowance

Challenge alignment:
Faster build and maintenance

Project stage:
Research

End date:
May 2026

As electricity demand continues to grow across the UK, finding smarter ways to increase network capacity is becoming increasingly important.

The **STEP UP** project is exploring whether upgrading selected parts of the existing 132kV distribution network to operate at 220kV could provide a practical, cost-effective way to meet future energy needs.

Think of our 132kV network as a motorway. As more homes, businesses, renewable generators and large energy users connect to the grid, key routes can become congested. By increasing the operating voltage from 132kV to 220kV, significantly more electricity could be transferred along existing routes, helping to relieve pressure on the network without the need for extensive new infrastructure.

Early assessments indicate that around 700 existing towers across our network area could potentially support 220kV operation, subject to detailed engineering studies. In some locations, this could be achieved

with little or no visible change to the infrastructure already seen by local communities.

The project’s first phase examined whether 220kV could become a viable option for UK distribution networks. The team assessed technical feasibility, planning and consenting requirements, and supply chain readiness. The findings suggest that the technology itself is achievable, with one of the key challenges being the current regulatory framework, which classifies voltages above 132kV as transmission.

With growing interest from network planners and positive early engagement with Ofgem, the project has demonstrated the potential for 220kV to provide a valuable new option between traditional 132kV reinforcement and much larger transmission infrastructure.

The results are encouraging and support further investigation, including the possibility of future real-world trials to assess how 220kV could help unlock capacity for the energy system of tomorrow.



In collaboration with:
Jacobs Engineering Ltd.



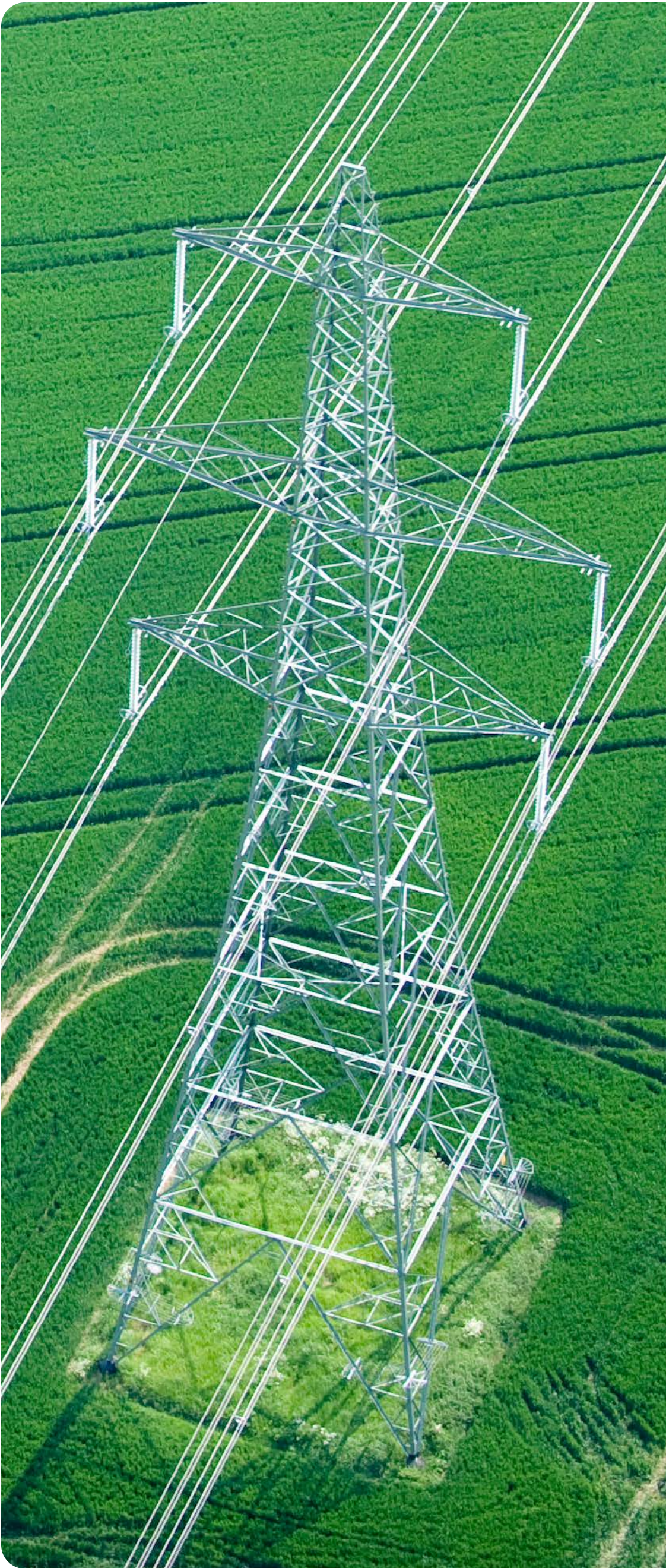
Customer benefit:
Increased connections

“We are exploring whether uprating selected 132kV circuits to 220kV could unlock significant additional capacity in parts of the network, and we hope that future feasibility work will identify where, over the coming years, 220kV could become a practical alternative to new transmission towers or additional 132kV circuits.”

Sarah Thorpe
Innovation Engineer



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Using wireless power to enable fast, flexible grid connections anywhere

Funding stream:
Strategic Innovation Fund

Challenge alignment:
Faster build and maintenance

Project stage:
Discovery phase

End date:
May 2026

Beaming electricity through the air may sound like science fiction, but for select use cases it could become a viable option on our network.

WPT for Grid was a discovery phase feasibility project, assessing whether a power beaming technology could complement our traditional overhead lines and underground cables and enable quicker, more flexible grid connections in the future. The concept is elegantly simple: a transmitter, an antenna connected to the network or generator, sends a highly focused microwave beam of power to a matching receiver, where it is converted back into electricity and synchronised with the network. Both transmitter and receiver are modular, allowing capacity to be increased by adding additional units.

Wireless power transmission could complement existing infrastructure by helping solve challenges that are too difficult, costly or time-consuming to address using standard methods. Potential applications include accelerating renewable energy connections, providing temporary network reinforcement,

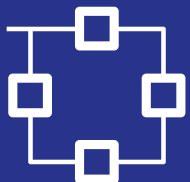
bypassing sections of network during maintenance or following storm damage, supplying power to construction sites and events, and reaching environmentally sensitive or geographically constrained locations.

Our feasibility study assessed the technology’s most promising use cases, alongside costs, scalability and deployment challenges. While current efficiency levels and equipment size limit near-term applications to temporary and specialist uses, advancements in technology could significantly expand its future role. Safety remains a key consideration, with multiple engineered protections designed to ensure the beam operates only within strict safety parameters.

The next step is to seek Strategic Innovation Fund alpha funding to develop a physical demonstrator and validate the technology through a real-world proof of concept. By combining our network expertise with specialist technology partners, we are exploring how wireless power transmission could help deliver faster, more flexible and more accessible connections for customers in the future.



In collaboration with:
Space Solar, National Grid Electricity Transmission and National Grid Partners.



Customer benefit:
Flexible connections

“This is a long term, visionary project. How can we make big step changes to deliver significant customer benefit, and what will a network look like in 20 or 30 years’ time?”

Sam Griffin
Innovation Engineer



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Real-time phase balancing to unlock capacity and cuts reinforcement costs

Funding stream:
Strategic Innovation Fund

Challenge alignment:
Instant use domestic energy devices

Project stage:
Beta phase

End date:
January 2028

As homes, businesses and transport increasingly electrify, balancing demand across the local electricity network is becoming more important than ever. Many low voltage networks operate on three phases, but over time customers do not remain evenly distributed between them. The growing uptake of low carbon technologies such as electric vehicles, heat pumps and solar panels can amplify these imbalances, reducing network efficiency, increasing losses and placing additional strain on assets.

The Phase Switch System offers an innovative alternative to traditional network reinforcement. Rather than upgrading cables, installing larger transformers or carrying out disruptive street works, the technology intelligently rebalances the network in real time. Housed within a compact roadside cabinet, it continuously monitors the low voltage network and automatically transfers customers between phases using advanced power electronics. By selecting the optimum switching position, the system helps maximise the use of existing network capacity while reducing stress on equipment and improving voltage performance for customers.

This year, the project has built on an earlier concept pioneered by UK Power Networks, delivering significant improvements. The latest design features a smaller cabinet footprint, enhanced power electronics and the removal of the brief lighting flicker associated with earlier versions. Extensive testing at the Power Networks Demonstration Centre (PNDC) at the University of Strathclyde has demonstrated reliable performance across a wide range of operating conditions, including interactions with household appliances, EV chargers and network faults.

Alongside technology development, the team has begun creating a data-driven planning tool to identify the locations where the system can deliver the greatest benefit. With an updated prototype nearing completion and field trials planned at carefully selected sites, the project is taking an important step towards everyday deployment.

Its goal is simple: enable more low carbon technologies, improve network resilience and reduce customer disruption by unlocking greater capacity from the network already in place.



In collaboration with:
Low Carbon Electric, Nortech Management, PNDC and UK Power Networks.



Customer benefit:
Improved reliability

“The Phase Switch System will rebalance load along the street automatically, allowing additional capacity for more electric vehicles, heat pumps and solar PV to connect. This will be done without causing significant disruption and digging up large parts of the road.”

Jacob Lynch
Innovation Engineer



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Business as usual

Some of our most valuable innovation is the kind customers never notice: proven ideas becoming part of everyday operation, making the network we already have work harder, safer and smarter. Here are three now moving into business as usual.

Fault prediction

A connected family of projects are shifting the network from reacting to faults to predicting them.

Pre-Fix brings data from different devices and existing assets into a single platform for HV fault analysis, delivering actionable post-fault insight within ten minutes of an event.

STAR Position is scaling that approach across overhead line networks, and **Hi-5** applies the same predictive thinking to underground cables, targeting replacement on evidence rather than age alone.

Pre-Fix technology is now being installed across 57 primary substations, with early successes already preventing permanent faults and the customer interruptions that come with them.

Challenge alignment:
Faster build and maintenance and Eliminating energy outages

Customer benefit:
Fewer outages

Improved pole inspection tools

We maintain more than 1.5 million poles across over 89,000km of overhead line, and around 163 HV pole failures a year contribute some £10.2 million to our customer interruption costs.

Inspections today rely on an inspector's interpretation of a hammer strike, which can vary.

Digital tools such as Smart Hammer capture granular condition data and feed it straight into our asset records.

We are trialling them with field inspectors in Leicester, Kettering, Redruth and Milton Keynes, in partnership with SSEN and Northern Powergrid, to improve safety, cut repeat inspections and reduce failures.

Challenge alignment:
Eliminating energy outages

Customer benefit:
Improved reliability

Big data

Smart Meter Innovations and Test Network (SMITN) set out to get more value from smart meter data, turning it into clearer visibility of the low voltage network and how customers are connected.

The original project built a validated low voltage test network covering the actual phase connectivity of 8,790 customers across 46 distribution substations in the Milton Keynes area, testing smart-meter-data algorithms for phase identification, planning profiles, feeder allocation and detecting low carbon technologies, delivered with CGI, HAYSYS and Loughborough University.

Building on that work, we are now rolling those learnings out across the business, working closely with our IT&D team, so that better data quality supports more automated network planning, better-balanced phases and fewer faults.

Challenge alignment:
Decentralised system balancing

Customer benefit:
Reduced faults



Spotting risk sooner and intervening earlier: innovation that has become business as usual.



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Not every project is ours to lead. Some of our most valuable contributions come from supporting other networks, bringing our scale, data and hard-won expertise to projects led elsewhere. Sharing what we know, and learning from others, is how the whole industry moves faster for customers.

Digital twin

Led by the National Energy System Operator, the four-year **Powering Wales Renewably** project is building a digital twin of the whole Welsh energy system, across electricity and gas, transmission and distribution.

As the DNO for South Wales, we are providing the network data and models behind it, drawing on our earlier Flexible Approaches for Low Carbon Optimised Networks (FALCON) and Common Information Model projects, and advising on how the tool will be used.

The project could deliver cost savings on energy bills of £58.5 million between 2030 and 2035, improved energy security, and a significant reduction in carbon emissions to improve air quality for Welsh communities.

Challenge alignment:
Decentralised system balancing

Customer benefit:
Reduced bills and improved energy security

Cooling flexibility

As summers warm, demand for space cooling technologies, like air-conditioning, will rise, adding to summer demand peaks.

Led by SP Electricity North West, **CoolDown** is building tools to help networks understand how cooling-related demand is likely to increase and unlock its flexibility, reducing the need for reinforcement.

We are supporting the beta phase SIF project, with Trial 2 extending into our larger, more varied licence areas to test whether cooling flexibility works across different climates and communities.

This trial draws on learnings from our very successful EQUINOX project that looked at flexibility in heating.

Challenge alignment:
Instant use domestic energy devices

Customer benefit:
Lower reinforcement costs

Smarter streetworks

Led by Cadent, Collaborate brings utilities together to coordinate their street works and planning, with the aim of reducing the disruption for customers and local authorities from roadworks.

The potential prize is significant: an estimated £42 million in benefits if utilities can co-ordinate excavation work to prevent the same street being impacted twice within months.

This is expected to increase by a further £16 million when NGED joins the roll-out.

The project moved into its alpha phase in June 2026.

We are helping to bring stakeholders together, with West Midlands and Greater Manchester Combined Authorities among the partners.

Challenge alignment:
Faster build and maintenance

Customer benefit:
Fewer disruptions



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Here you can find our innovation projects, grouped by funding stream.
You can read more about any of them on the [Smarter Networks Portal](#) or at [nationalgrid.co.uk](#)
Each project is tagged to the challenge it supports.

Network Innovation Allowance (NIA) projects

Project name	Stage	Challenge
Connection Journeys AI	Closed	
Direct Insulation Real-Time Temperature (DIRT)	In delivery	
Flexexpectation	In delivery	
Future of Security of Supply for Electricity Distribution – Initial Research	Closed	
Geoprint for Energy Club Connections and Operations (GECCO)	In delivery	
Headroom – Whole System Thinking	Closed	
Hi-5	In delivery	
High Voltage Phase Identification (HV Pilot)	In delivery	
HV Pinpoint	In delivery	
Intelligent Management and Post-fault Active Control Techniques (IMPACT)	In delivery	
LCT Harmonic Limits	Closed	
V2G Dynamic Headroom Control	Closed	
Low Voltage – Active Power Control Transformer (LV ACT)	In delivery	
On-Boundary Enhanced LCT Integrating Service Cabinet (OBELISC)	In delivery	
Sub-Transmission Enhanced Performance: Uprating Power to 220kV (STEP:UP)	In delivery	

Network Innovation Competition (NIC) projects

Project name	Stage	Challenge
Equitable Novel Flexibility Exchange (EQUINOX)	Closed	

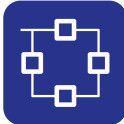
Strategic Innovation Fund (SIF) projects

Project name	Stage	Challenge
Rural Energy and Community Heat (REACH)	Alpha - Closed	
Road to Power	Alpha - Closed	
Planning Regional Infrastructure in a Digital Environment (PRIDE)	Beta - In delivery	
Phased Switch System	Beta - In delivery	
WPT for Grid	Discovery - In delivery	

Business funded projects

Project name	Stage	Challenge
Arc-Aid	In delivery	
Distribution OLTC transformer trial	In delivery	
Improved Pole Inspection Tools	In delivery	
LV Pre-Fault	In delivery	
LV Visibility	In delivery	
OHME Data Partnership	Closed	
Power Quality Roll-out	In delivery	
Smart Fault Passage Indicator Roll-out	In delivery	
Smart Meter Innovations and Test Network (SMITN) Roll-out	In delivery	
STAR Position	In delivery	

Energy Network Innovation Taskforce (ENIT) Challenge Areas



Industrial and business connection acceleration



Faster build and maintenance



Instant use domestic energy devices



Eliminating energy outages



Decentralised system balancing

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Innovation only delivers when its lessons are shared. Engaging with our stakeholders and getting the findings of our projects out into the world, openly and often, is how good ideas spread across the industry and reach the customers they are meant to serve.

This has been our busiest year yet, with over 60,000 touch points, from project webinars and international conferences to internal workshops and innovation funding events, and we have opened up new channels to keep our audiences informed every step of the way.

Project webinars

We held nine end-of-project webinars this year, sharing final outcomes, key findings and next steps. All are available to watch on our website.

Innovation newsletter

Launched in August, our monthly newsletter now reaches more than 1,000 people, with new projects, event invitations, call-outs for project partners and updates on our portfolio.

Energy Innovation Summit 2025

We joined our colleagues in transmission on a shared stand, showcasing the breadth of our projects through presentations, poster sessions and discussions, and hearing where the rest of the industry is heading.

CIRED 2025

At this international conference for electricity distribution, our Innovation Engineers represented projects including EQUINOX, HV Pinpoint and PRIDE, and brought fresh perspectives home.

Utility Week Live 2025

Across both days our team presented our PRIDE and Phased Switch System projects, alongside the water, electricity and gas sectors.

WPT for Grid launch

Our February project launch generated impressive engagement: picked up by more than ten media outlets, our best-performing innovation LinkedIn post of the year, and widely shared by colleagues across National Grid.



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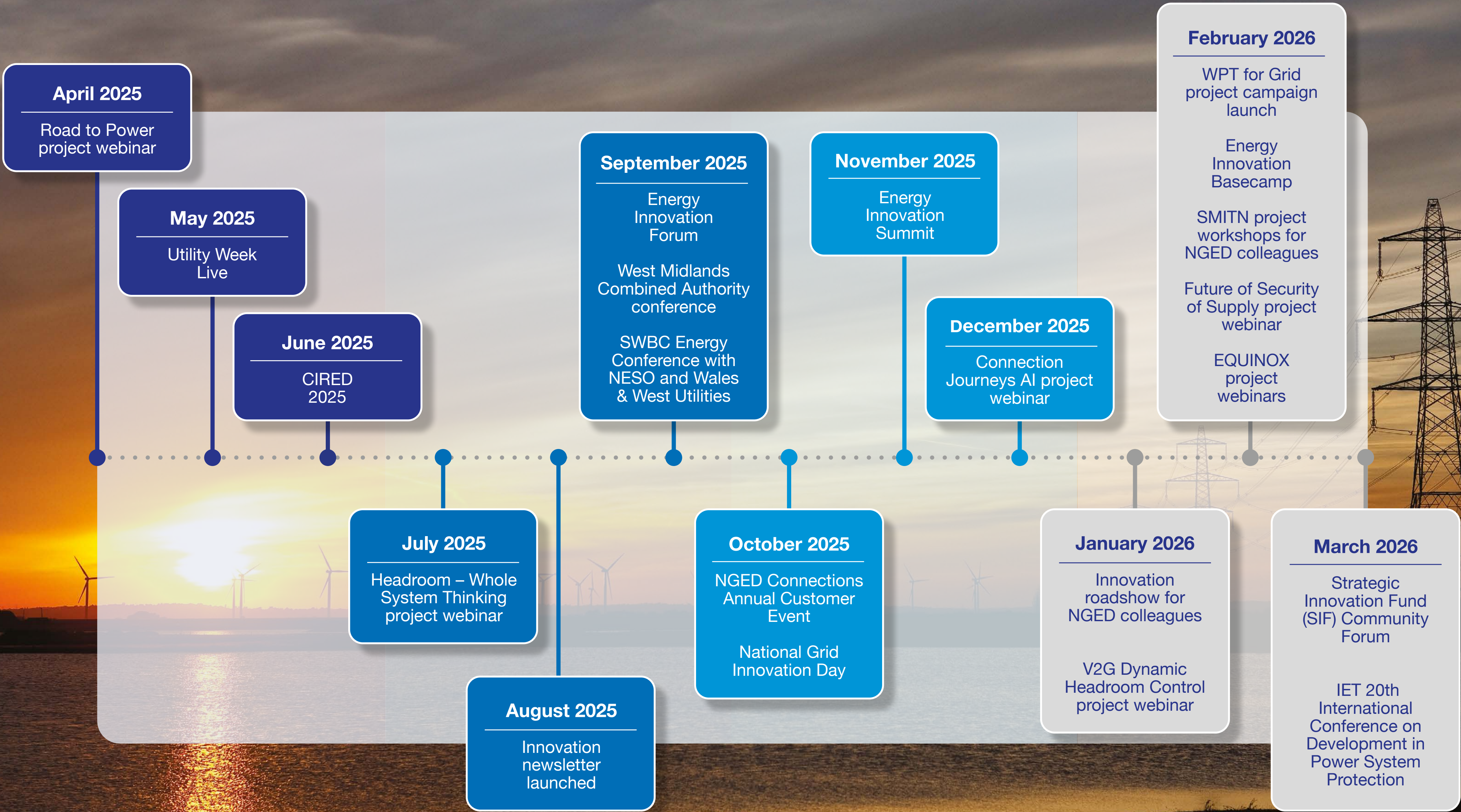
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What comes next is systemic change, and it has already begun.

The next twelve months will redefine what innovation means at National Grid Electricity Distribution. Our statement of intent sets out our ambition to redefine innovation within the sector and help deliver a world leading distribution network for the UK.

We are pushing into genuinely new territory. WPT for Grid is exploring whether power can be delivered at grid scale without wires, which could change what getting connected means for customers. Quantum sensing is opening up ways of seeing the network that have never existed before.

We are also changing how we work: partnering with forward thinking innovators and disruptors, bringing industry leaders together through our Living Innovation programme, and aligning everything we do behind the five industry innovation challenges.

Above all, we are turning innovation into delivery. The projects showcased in this report prove we can take bold ideas from trial through to business as usual. That track record is the foundation for the change ahead.

We said we are going bigger and bolder. Here is where it starts.



Systemic change for our network and our customers starts now.

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Keep in touch



Keep up to date with the latest innovation news and events by joining our **mailing list**.

You can also view our projects, strategy and more on our website.
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