NETWORK INNOVATION ALLOWANCE ANNUAL SUMMARY REPORT

2025-2026

1. Foreword - Our Vision

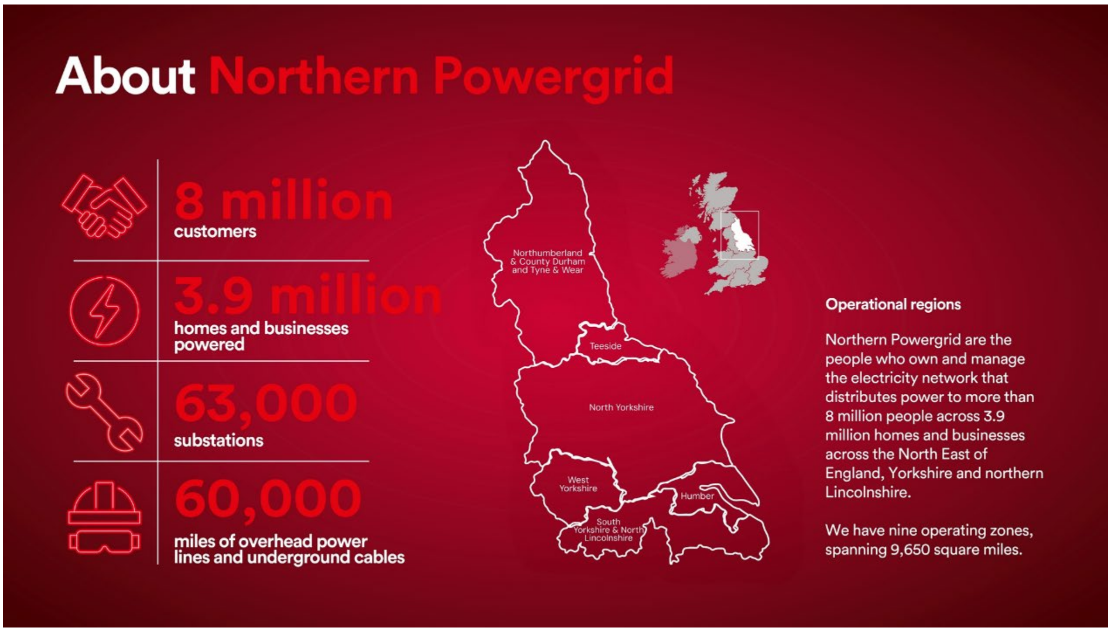
Northern Powergrid is shaping the future of energy by delivering a smarter, more sustainable and customer-centric electricity network.

As the energy landscape evolves, we are committed to ensuring our network is ready to support new technologies, facilitate the transition to net zero, and provide a reliable power supply to the customers and communities we serve.

Our vision is built around three key priorities; enhancing network resilience, accelerating decarbonisation, and delivering outstanding customer service.

We are investing £2.7 billion between 2023 and 2028 to modernise our infrastructure, integrate renewable energy, and provide innovative services that make energy more accessible and efficient for all.

Through innovation and strategic planning, we are preparing for the future while keeping customers at the heart of everything we do. Our plan ensures that we continue to power communities safely, affordably, and sustainably, now and for generations to come.



Introduction

1. This report has been prepared by Northern Powergrid (NPg) to inform interested parties of the innovation project activities of its electricity distribution licensees, Northern Powergrid (Yorkshire) Electricity Distribution plc, and Northern Powergrid (Northeast) Ltd. It covers the regulatory reporting period from 1 April 2025 to 31 March 2026.

2. A single report has been prepared because the two licensees are operated under common management, sharing best practice between them. Our approach to research and development is no exception, and we draw no arbitrary distinction in the innovation carried out for the two licensees and our innovation strategy is designed to be equally applicable across our full geographic area of operation. Projects and programmes are therefore set up and progressed jointly for both licensees.

3. The report primarily focuses upon projects eligible for funding under Ofgem's ED2 Network Innovation Allowance (NIA) but touches on those funded through the Network Innovation competition (NIC, ED1) and the Strategic Innovation Fund (SIF, new for ED2). Reporting of learnings from NIC and SIF projects will be conducted as per their respective Governance documents.

4. The report has been prepared in accordance with Standard Licence Condition 46 of the electricity distribution licence, the associated Regulatory Instructions and Guidance (RIGs) and the Electricity Network Innovation Allowance Governance[1] document. In particular, the obligations specified in chapter 5 relating to the requirements for an annual summary of NIA activities. The report has been expanded to include a high-level progress on key Network Innovation Competition (NIC) and Strategic Innovation Fund (SIF) activities. NIC and SIF project learnings will be disseminated in accordance with the agreed project deliverables in their respective Project Directions.

2. Summary of 2025/26 Network Innovation Allowance Investment

5. In 2025/26 NPg utilised £1.55m (2020/21 price base) of its Network Innovation Allowance (NIA).

6. In October 2025, following a detailed assessment by Ofgem, NPg was awarded[2] a further £6.3m NIA allowance for years 4 and 5 of ED2. This increased the total ED2 allowance to £13.8m

7. To date in ED2, NPg has expended £4.66m (2020/21 price base), 33.7% of its £13.8m ED2 NIA allowance.

[1] RIIO-2 NIA Governance Document: Version 4

[2] RIIO-ED2 Network Innovation Allowance (NIA): Additional Funding Decision

8. We can also summarise the total network innovation allowance spending (adjusted to 2020/21 base price) for the ED2 period across the two Northern Powergrid licence areas:

Recoverable NIA (£m in 2020/21 prices)			
	Northeast	**Yorkshire**	**Total**
2023/24	£0.75	£1.00	£1.75
2024/25	£0.57	£0.77	£1.34
2025/26	£0.64	£0.85	£1.49
		Total	**£4.58**

Table 1 – Summary of ED2 NIA spend to date

9. Internal spending in 2025/26 represented 10% of the total investment. This is below the governance maximum limit of 25%.

3. Network Innovation Allowance (NIA) Innovation Activities

10. In this reporting year Northern Powergrid has participated in 18 active NIA projects. Six of these are collaborative projects with at least one other GB electricity distribution network operator (DNO) or gas distribution network (GDN) operator and 13 were led by Northern Powergrid.

11. Six new NIA projects were registered on the Smarter Networks Portal in 2025/26, and these are shown in table 2 along with their alignment to the Energy Network Innovation Strategy (ENIS).

Project Title	Reference	1° ENIS Theme
Flex-ENC	NPG_NIA_055	Flexibility and commercial evolution
Inclusive Flexibility	NPG_NIA_056	Consumer vulnerability
Storm Triage 2	NPG_NIA_057	Optimised assets and practices
Volt Fault	NPG_NIA_058	Optimised assets and practices
SafeGrid	NPG_NIA_059	Optimised assets and practices
Flex Select	NPG_NIA_060	Flexibility and commercial evolution

Table 2 – NIA projects registered in 2025-26

12. We continue to collaborate with other Distribution Network Operators (DNOs) and Gas Distribution Networks (GDNs) and undertake joint activities where possible. Projects which we have supported in 2025_26 include the Keeping Comms Open during HV Faults (NIA_UKPN_0105) as well as The Vulnerability Visualisation Tool Phase 3 (NIA_NGN_458) with Northern Gas Networks, in support of vulnerable customers. We are collaborating with NESO on its

CASCADE - Communication Adaptive Systems for Coordinated Architecture and Data Exchange (Discovery) project (NIA2_NESO089) which aims to overcome conflicts arising between balancing and Active Network Management and improve data sharing procedures between network stakeholders.

13. These projects each directly support one of our six transformational innovation needs and support delivery of our 2023-28 business plan commitments. Appendix A details the ED2 portfolio view of NIA and SIF projects and alignment with NPg's ED2 Strategy.
14. Appendix A identifies those projects where Northern Powergrid is the sole participant or, where we are working alongside other licensees and the nature of the collaboration involved. For projects where Northern Powergrid is either sole participant or, in the case of collaborative innovation, where Northern Powergrid is the designated lead licensee we have posted the required annual progress update or closedown report on the ENA Smarter Networks Portal.

Delivery of our ED2 Innovation Strategy

15. At Northern Powergrid, innovation is at the heart of everything we do. We support projects that address real-world challenges, deliver consumer and network benefits and accelerate the transition to a net zero future. We are delivering our ambitious RIIO-ED2 programme and actively seeking new projects that benefit our network,
our customers and the wider system.
16. Our ED2 innovation strategy[3] seeks to achieve four key outcomes:

- **Chart the best course to net zero:** Developing and deploying technologies and creative solutions that enable faster, lower-cost pathways to decarbonisation.
- **Unlock the value of open data for an increasingly digitalised network:** Working with partners to open up new channels and techniques that significantly, efficiently and effectively increase the exploitation of data flows and digitalisation across the whole energy system.
- **Achieve next-level energy system dependability:** Increasing the reliability, resilience and security of the power grid to improve not only its own dependability, but also that of the overall energy system.
- **Make sure all customers benefit**: Promote and safeguard the interests of customers, particularly those who otherwise might be significantly disadvantaged or left behind in the energy transition.

[3] Innovation_strategy.pdf

To achieve these outcomes, we have identified six key areas where we will have to transform our current capabilities:

- **IN1:** Identifying opportunities to accelerate the benefits of flexibility
- **IN2:** Developing sophisticated data management and analytics to inform energy system forecasting, planning and real time decision making.
- **IN3:** Enhancing the connections process to facilitate higher volumes and different types of connection.
- **IN4:** Maintaining dependability of the energy system as seen by the customer during the energy system transition to decarbonisation.
- **IN5:** Removing barriers preventing access to the energy system including access to energy data, particularly for those not currently engaged or informed, vulnerable or less advantaged.
- **IN6:** Creating capabilities to deliver a next generation local energy network that links up whole system energy sources and vectors, balancing in real time.

17. We are working with internal and external stakeholders to ensure our emerging project activities are spread across these transformations. This includes participating in the annual ENA Basecamp activities.
18. Appendix A details the projects active in the reporting period and the ED2 innovation strategy outcome that the project meets.
19. We have continued to support the Energy innovation Centre (EIC) during 2025/26, as we have done since its inception in 2008. This is an activity undertaken in collaboration with a number of DNOs and GDNs as well as other utilities. It is designed to both identify and encourage innovations from new

sources, such as other industries or SMEs with no previous experience of working with the electricity distribution network operators.

20. This year we began four further cross-industry NIA projects with the EIC. These include Inclusive Flexibility (NPG_NIA_056), SafeGrid (NPG_NIA_059), Power Wheels (NPG_SIF_024) and Rethinking Communications for Digital Exclusion (NIA_NGN_492).

21. Northern Powergrid also supports innovation activities undertaken through Energy Networks Association (ENA), such as the annual ENA Basecamp, the Energy Innovation Forum, as well as the Energy Networks Innovation Process (ENIP) and the Energy Networks Innovation Strategy refreshes.

22. Our collaborative approach to innovation is evidenced through cross-industry project partnerships with other DNOs/GDNs, respected academic research institutions, community teams, consumer interest groups, consultancies and expert SMEs. Working with diverse consortia reinforces our commitment to innovating to support our customers on the transition to net zero and ensures we bring together suitable expertise to develop quality projects and deliver robust analysis.

23. We will continue to support project dissemination and ideation through the annual Energy Innovation Summit conference while it still serves our regulatory requirements.

24. As we prepare for submission of our draft ED3 Plan, we have been engaged with Ofgem and UKRI's Energy Networks Innovation Taskforce (ENIT) process which has sought to identify 5 challenges for transformative innovation to be delivered through the Strategic Innovation Fund.

Key learnings from NIA Projects

25. The annual/ closedown reports for each of the individual projects are available on the ENA smarter networks portal. These address the learning, both in terms of the delivery process and the project outcomes for each activity. Many of our projects are in progress and their nature is such that the conclusions on the learning delivered cannot be fully understood in the context of a partially completed project and the activities must run to their scheduled end point before conclusions can be drawn. This section of the report aims to give a high-level look into learning from projects during this reporting period.

NPG_NIA_018: MicroResilience – Active Project

Background

26. MicroResilience is developing, through novel integration of technologies, a microgrid architecture for improving network resilience. It is an innovative approach to protecting rural communities power supplies which aims to provide resilience against extreme weather conditions which would otherwise result in a network outage.
27. The project will demonstrate the re-deployment of energy storage systems that were installed as part of the Customer Led Network Revolution project. By demonstrating the benefits of energy storage as a flexible and re-deployable asset to support network operation, the business case for DNO-owned storage will be reinforced.

28. We have been working with Smarter Grid Solutions and Turbo Power Systems to deliver the complex technical solutions required: Smarter Grid Solutions (SGS), a specialist in smart grid innovation, flexible control solutions and experience in the roll-out of OpenFMB protocol, is supporting smart grid interoperability and Turbo Power Systems (TPS) is providing an innovative power electronic device to deliver flexible control and islanding capability for the resilient microgrids.

Key Learnings

29. As decarbonisation increases its reliance on electricity, especially in rural areas, network resilience becomes critical. The MicroResilience project has demonstrated a novel use of existing technologies to form microgrids within the DNO network. Trialled in Byrness, a village of circa 50 properties in rural Northeast England, the solution, once final commissioning has been completed, will improve the community's resilience to faults, storms and shared network failures.
30. The approach also enhances cyber resilience through semi-autonomous operation, addressing rising cyber risks as energy systems become more digitised. Additionally, the project supports development of open-standards

communications and peer-to-peer interoperability, strengthening the technical foundations for the transition to a DSO model.

31. Improved network resilience has a direct benefit in customer service over and above the IIS benefits, particularly on the short duration outages where CI and CML would not be, and also in critical areas of the network where a resilient supply solution without common cause failure is desirable.
32. Reduction in restoration time for customers in resilient areas while depressurising the immediate response of our operational staff will have general benefits to safety and operational staff performance.
33. There are benefits in terms of lowering carbon emissions due to both work avoided and renewable generation connected and utilised, reduction in environmental disruption to consumers and general improvements in quality of life for populations around the project activities.
34. The project serves as a test bed for the application of open-standards communications architectures which are believed to be critical to the on-going smartening of the grid into the DSO model, particularly with reference to interoperability and control methods facilitated by peer-to-peer transfer of data.
35. Gaining an understanding of the technological attributes (benefits/limitations/challenges) of microgrid solutions and developing standards, specifications, and best-practice for their secure design, simulation, commissioning and operation will de-risk the NPg's future as this is considered one of the potential customer focused models for a DSO future.

Next Steps

36. The final phase of this project includes finalisation of the operations document for safe operation of Microgrids – April/May 2026 and completion of closedown reporting in Q3 2026. Learning will feed directly into the Multiresilience (NPG_SIF_013) project.

NPG_NIA_032: Boston Spa Energy Efficiency Project (BEET) - Active Project

Background

37. The Boston Spa Energy Efficiency Trial (BEET) is trialling a software-based system using customer smart meter data in real time to lower the LV voltage across two primary substations. The objective is to bring about a conservation voltage reduction (CVR) which benefits the customer through savings on their electricity bills and reducing carbon emissions.

Key Learnings

38. Both open and closed loop trials of the BEET-box concept have proven that the algorithms function as expected. Between September 2024 and August 2025, the system ran in closed loop mode, providing a voltage reduction to two primary substations serving circa 15,000 customers.

39. During the closed loop trial period, September 2024 to August 2025, an average voltage reduction of 3% was being achieved. Based on a conservation voltage reduction (CVR) factor of a 1% voltage reduction to 1% energy reduction and a typical domestic customer annual consumption of 3,000kWh this equates to an annual energy saving of £23 per customer and carbon saving of 18kg (based on a unit cost of 25p per kWh and a carbon intensity of 270 kgCO2e/MWh). Across the trial area (15,000 customers), this equates to an estimated annual saving of £337k and 280 tonnes of CO_2.

Next Steps

40. Before closing down the BEET project there are a couple of points we need to explore to understand how the solution could become scalable. Firstly, we need to understand whether the smart metering systems can cater for the volumes of voltage data required; we are currently configuring our systems to carry out performance volume tests to assist with this. Secondly, we are working on a proof of concept with GE to extract HV network topology information from the network management system that will work across all primary substations.
41. Alongside, this we are developing the technical architecture for the OT hardware that will deliver the scaled out Dynamic Voltage Optimisation (DVO) system. DVO will be the name that will replace BEET for the business-as-usual system. Once we have the technical architecture, we can obtain costs for the hardware which will form part of the business plan required to be authorised prior to initiation of the DVO project.

NPG_NIA_046: BESS P28 – Active Project

Background

42. The project is assessing Engineering Recommendation (EREC) P28 Issue 2 (UK standard that sets planning limits for voltage fluctuations) and recommending methodologies and approaches for assessing voltage fluctuations caused by Battery Energy Storage Systems (BESS) considering the commercial services BESS provide.

Key Learnings

43. A critical assessment has been made of EREC P28 in relation to BESS operation. This provides clarity around the three assessment areas of P28 namely: voltage step, rapid voltage change and flicker. A comprehensive list of proposed clarifications and additional guidance associated with P28 has been identified to ensure it is fit-for-purpose. The most significant aspect has been clarification of how to assess BESS operation against the definition of step voltage change given voltage changes are continuous ramps rather than discrete voltage change events. Also, how tap-changer operation should be treated is dealt with. These findings have been communicated to the DCRP EREC P28 working group.

44. A simplified methodology has been developed for assessing voltage fluctuations from BESS and NPg policy has been updated. In short, this recommends that BESS should either be required to operate with zero reactive power transfer (unity power factor) or at a fixed MVAr output. The P28 assessment should be carried out at this operational power factor rather than across a range of power factors. A detailed study has been carried out on a test network. The key output from this study is that a potential risk exists associated with coincident power swings of BESS units on the same network due to the aggregation of voltage dips and swells on downstream busbars. These swings can be associated with BESS units providing identical services, such as frequency response or when transitioning between trading periods. Use of a single BESS in voltage control may be beneficial to a local area but would require several key operational and management decisions to be agreed. Widespread use of multiple BESS units in voltage control in the same area should not be considered, due to potential oscillations between the control systems.
45. The overarching recommendation is that the large-scale roll-out of BESS units onto a network does contain numerous risks, that are not currently captured through current policy and steady state analysis techniques. More complex RMS simulation and eigenvalue analysis can be employed by network operators or developers to mitigate these potential problems, but this would require standardisation of techniques, modelling practices and data sharing.
46. The guidance produced by this project will facilitate the connection of BESS by providing less restrictive limits on how a BESS can operate at a particular location. As energy storage is used to facilitate increasing amounts of renewable generation connected to the grid, which is low carbon and lower cost than fossil fuel generation this will produce a net benefit to consumers.

Next Steps

47. A report making recommendations for updating NPg policy and procedures will be produced regarding the long-term assessment of BESS against P28.

NPG_NIA_051: Resilient Customer Response - Closed

Background

48. The first phase of the RCR project was carried out through a SIF Discovery project (NPG_SIF_004). It explored different solutions that could use behind-the-meter (BTM) assets to provide resilience and identified the solution of using a microgrid as the secondary substation level, using a central grid-forming battery to restart the grid in the event of a power cut, and behind-the-meter assets to provide supply to customers.

49. This follow-on NIA project (NPG_NIA_051) has explored the proposed technical solution and business models in further detail. The concept focused on

reconfiguring the LV circuits to form an islanded microgrid during an outage above the secondary substation.

50. The proposed solution is a hybrid resilience model that distributes energy storage across both the substation level and selected vulnerable households, enabling an LV microgrid to operate during outages on the high voltage (HV) network while ensuring vulnerable customers retain a secure supply even during localised LV faults. Within this model, resilience capacity is shared between:

    – A small, communal grid-forming battery installed at the secondary substation or within a local warm hub.

    – A network of small, front-of-meter household batteries deployed in the homes of medically vulnerable customers, identified using Priority Services Register (PSR) criteria. These units are provided and installed at no cost, positioned outside the meter in a dedicated enclosure, and configured to operate as uninterruptible power supply (UPS) systems.

Key Learnings

51. The full suite of project reports, including customer journey, technical modelling and network impact reports, has been published on the Smarter Networks Portal[4]. The key learning points from the project show that a simple, fair, DNO-led model without customer fees is most acceptable, while the hybrid microgrid approach is technically viable and supported by testing. Distributed energy resources like PV, batteries and V2G will increasingly enhance resilience but require more advanced control, and early demand reduction during outages is crucial to extend backup duration. The strongest value comes from targeted deployment in high-risk, high-asset areas rather than universal rollout, alongside necessary regulatory updates and improved LV visibility and operational processes. Ultimately, customer trust, clear communication and fairness are essential for participation, and the project aligns strongly with Northern Powergrid's broader innovation portfolio.

Next Steps

52. Learning from the project will be fed into the active Community DSO NIC project (NPG_NIC_001). A potential follow up to the project would be to run a live low-voltage field trial with clear learning objectives, testing a central battery system alongside vulnerable-home UPS units to validate both technical performance and operations. Delivery should be clearly defined, either by integrating into an existing programme for efficiency or running a standalone trial

[4] https://smarter.energynetworks.org/projects/npg_nia_051/

for clearer evidence, supported by robust commercial arrangements with third-party storage providers. Site selection must target areas with the greatest resilience need, using outage history and asset availability, while key technical challenges, such as control coordination, restart sequencing and voltage management, are resolved ahead of deployment. At the same time, improved LV visibility, monitoring and operational processes are required, alongside a coordinated effort to evolve regulatory frameworks. Successful delivery will depend on a customer-led approach with clear communication and inclusive participation, and on measuring outcomes such as reliability improvements, cost-effectiveness and customer trust to inform future business-as-usual decisions.

NPG_NIA_052: Supporting Warm Hubs - Closed

Background

53. The Supporting Warm Hubs project has been a collaborative effort, bringing together subject matter expertise from National Energy Action, Northern Gas Networks, National Grid Electricity Transmission, National Gas, and Egnida. The project has explored how networks can help customers in vulnerable situations through supporting and improving Warm Space infrastructure, providing energy advice and support within Yorkshire and the Northeast. Leveraging the resource and experience of all project stakeholders, it aimed to create a holistic action plan to support Warm Spaces in providing energy advice and support and to tackle consumer vulnerability.

Key Learnings

54. The project reinforced that Warm Spaces are trusted, community-based hubs that play a vital role in supporting vulnerable people and are highly effective settings for delivering energy advice. Their informal, welcoming nature helps overcome barriers such as digital exclusion, distrust of formal services, and lack of awareness, enabling users to access practical support on bills, energy use, and financial assistance.
55. Challenges around funding, staffing, training, partnerships, and accessibility can, however, limit their sustainability and reach. Effective delivery relies on integrating advice into existing activities, building trusted relationships, using simple resources and practical support, and working with partners. Overall, there is strong demand for accessible, face-to-face energy advice, and initiatives like the Open Doors Support Network demonstrate that targeted funding, training, and resources can significantly build capacity, improve confidence, and deliver meaningful benefits for both organisations and users.
56. The project engaged with more than 110 Warm Spaces, distributing energy advice literature to over 358 service users, and training over 130 professionals and volunteers to improve energy advice capability.

57. Through the Open Doors Support Network, 30 organisations joined the network, with 15 receiving a full support package, including £27,000 of direct funding, over 40,000 energy advice documents, over 400 Winter Warmth Support Packs, and more than £1,000 in energy demonstrator items. These outputs led directly to increased organisational capacity to host energy advice sessions, distribute practical support, and make referrals into specialist services.

Next Steps

58. Embedding energy advice in trusted Warm Spaces is an effective, scalable way to support vulnerable customers, particularly through informal, face-to-face engagement supported by practical resources and partnerships with expert providers. Future delivery should adopt flexible, partnership-led models with tailored support, modest funding, and clear referral pathways, while extending programme duration to build lasting capacity. Further work should focus on scaling and integrating this approach into wider support systems, including testing coordination models and using Warm Spaces to gradually introduce more complex energy topics.

NPG_NIA_053: Power Wheels – Closed

Background

59. The Power Wheels project idea was first pitched to NPg at the ENA Basecamp in 2024. The concept will trial whether the energy demands of vulnerable populations can be addressed by making the most of emerging technology such as V2X and maximising the benefits of flexible EV Charging. The discovery-level NIA project aimed to understand the viability, feasibility and desirability of Vehicle to Grid (V2G) and Vehicle to Home (V2H) services to investigate whether a Virtual Power Plant can be created from them using mobility-leased vehicles. Working alongside the Centre for Energy Equality, Energy Systems Catapult and the Energy Innovation Centre, the feasibility study wrapped up in Q3 2025.

Key Learnings

60. Through a combination of technical modelling, customer research, financial analysis, and stakeholder engagement, the project demonstrated that Motability customers are willing to participate in flexibility services when offerings are accessible, reliable, and trusted, with resilience and bill reduction as key motivators. The initial network modelling shows that Motability EVs aggregated flexibility could be critical in constrained zones and outage conditions.
61. Smart charging (V1G) offers immediate, low-risk benefits worth around £281 per year per vehicle in additional value compared with standard Time-of-Use charging. Vehicle-to-Grid (V2G) and Vehicle-to-Home (V2H) technologies could

transform EVs into income-generating assets, with benefits of up to £863 per year per vehicle, while providing resilience during power outages.

62. At fleet scale, the programme has potential to unlock ~£98 million in net present value over 10 years, with significant additional system value through deferred reinforcement and enhanced renewable integration.

Next Steps

63. The project has secured additional funding through the Strategic Innovation Fund (SIF). The Power Wheels alpha-phase project (NPG_SIF_024) commenced in April 2026 with Motability joining as a trial partner.

NPG_NIA_054: Dynamic Pricing - Closed

Background

64. Current static Distribution Use of System (DUoS) charges do not reflect the increasingly dynamic nature of network demand, with peak periods shifting due to behaviours such as demand clustering around negative wholesale prices. While explicit flexibility services can help manage constraints, they introduce additional cost, complexity and are often applied in silos rather than across the whole network. This project proposes the development of dynamic, day-ahead network pricing that reflects real, systemwide conditions across multiple voltage levels and even individual assets, providing coordinated implicit price signals that drive the same beneficial behaviours as contracted flexibility but more efficiently. Using network monitoring, pricing optimisation and two alternative pricing models for comparison, the project builds on UKPN's Shift 2.0 work and will be delivered with Octopus Energy and KrakenFlex, who will optimise distributed energy resources against dynamic network prices alongside wholesale market signals.

Key Learnings

65. The project demonstrated that dynamic network pricing (DNP) is a viable tool for managing network congestion and influencing customer behaviour, with clear evidence that price signals can shift demand away from constrained periods. A multi-voltage, opt-in pricing model delivered through suppliers or aggregators is practical and avoids major regulatory change, but requires careful design to balance incentives, protect vulnerable customers, and ensure commercial viability.

66. Key learnings highlight that pricing must be set at effective levels (moderate signals work, while very high prices add risk without much extra benefit), and that outcomes vary significantly by location and network conditions, meaning a one-size-fits-all approach is unsuitable. Strong data visibility, forecasting, and coordination with other flexibility mechanisms are essential, as are clear commercial arrangements and risk/reward structures to encourage participation.

67. Overall, DNP has strong potential to defer reinforcement and improve system efficiency, but future deployment should refine pricing design, expand beyond EVs to other technologies, and address operational, commercial and whole-system coordination challenges to enable scalable business-as-usual implementation.

Next Steps

68. The project partners will continue to develop ideas around Dynamic Pricing and how the concept could be piloted in a business-as-usual setting. Future projects could go further by testing other technology types such as heat pumps or generation as this trial focused purely on domestic EV chargers. Under business-as-usual deployment, it may be desirable to measure performance at the boundary point rather than asset level metering as this would consider the net import / export of each premises.

NPG_NIA_055: Flexibility Enabled New Connections – Active

Background

69. The Flex-ENC project is researching ways to use customer flexibility services to accelerate new connections. Flexibility services will be assessed on their ability to resolve the network, process and regulatory constraints which delay the connection of new generation, storage and demand projects while mitigating or removing the need for the new connecting customers to accept a curtailable or flexible connection agreement, which might result in them having reduced access to the network.
70. It will also explore the potential for associated benefits to be realised such as customer flexibility working as a 'bridging' solution to allow for the real-world impacts of the new connection on the network to be realised. By allowing such real-world impacts to be better understood, network planning engineers are then able to optimise network reinforcement based on this or potentially avoid the need for network reinforcement at all, lowering costs for the development of the network.

Key Learnings

71. The project remains in-flight and learnings are yet to disseminated. The project is progressing as planned, with the project technical design and set-up and constraint mapping work packages completed.

Next Steps

72. The next work package will undertake modelling work to assess the impacts and associated cost / benefit analysis of coordinating flexibility to mitigate the need for reinforcement associated with new connections.

NPG_NIA_056: Inclusive Flexibility – Active

Background

73. The purpose of the Inclusive Flexibility project was to identify practical solutions and actions that Northern Powergrid can implement to enable and support vulnerable consumers to participate in energy flexibility initiatives. This is vital to developing an inclusive, resilient energy system and supporting the transition to decarbonised power. Vulnerable consumers often have limited control over their energy use and reduced access to energy-efficient technologies, which can make participation challenging. Ensuring their inclusion in flexibility initiatives could enable the provision of targeted financial support, appropriate smart technologies, and tailored incentives. This allows vulnerable households to benefit from reduced energy costs and engage in schemes that reward flexible energy use. In addition, inclusive participation may help in prevent widening inequalities in energy access while strengthening overall system resilience. It contributes to reducing peak demand, increasing demand-side flexibility, and facilitating the transition to low-carbon, renewable energy sources.

Key Learnings

74. The project conducted a comprehensive assessment of the barriers preventing vulnerable customers from engaging in flexibility initiatives, finding that these must be addressed before behaviour change can be expected. Many households face foundational challenges such as low energy literacy, financial hardship, crisis situations, and limited capacity to engage, making flexibility a low priority. Key barriers include digital exclusion, cost constraints, housing conditions, health needs, trust, and entrenched routines, with the most critical relating to safety, everyday practicality, and clear communication. Participation is unlikely if flexibility risks comfort or health, disrupts essential routines, or feels too complex. Even where financial benefits exist, flexibility is often perceived as low value, risky, and difficult to understand, with low trust and confusing messaging further reducing engagement. Effective approaches therefore require simple, familiar communication, ongoing support, and solutions that integrate seamlessly into daily life. Overall, the findings highlight that inclusive flexibility must be grounded in real-life circumstances, starting with stabilising households and building understanding, and ensuring participation is safe, simple, low-risk, and clearly beneficial over time.

Next Steps

75. The next step will be to design potential follow-on projects which directly address some of the challenges faced by Low Income and Vulnerable consumers identified during the Inclusive Flexibility project.

NPG_NIA_057: Storm Triage 2 - Active

Background

76. Storm Triage 2 utilises machine learning and process to upskill front runner users and standardise reporting, to free up decision-making human resource for other valuable tasks. It seeks to deliver a game-changing new tool and embedded process for the deployment of frontrunners, capture and submission of essential information and the prioritisation of restoration works.

Key Learnings

77. The project remains in-flight and remains on-track, under its defined workstreams to complete its core development requirements and progressing into the internal testing and quality assurance phase.

Next Steps

78. Once internal testing is completed, the Storm Triage App will be trialled in the field, allowing thorough testing of the concept by frontrunner colleagues.

NPG_NIA_058: Volt Fault - Active

Background

79. The aim of this project is to investigate and quantify the impact of increasing penetration of inverter-based renewables on short-term voltage stability (STVS) and fault levels within Northern Powergrid's future ED3 network. As the scale and materiality of these impacts are currently uncertain, the project will deliver strategic insights to inform investment decisions and support the development of Northern Powergrid's Distribution System Operability Framework (DSOF).

Key Learnings

80. The project remains on track to fulfil its objectives. A literature review has been conducted to investigate the nature of short-term voltage stability and how increased inverter-based renewable (IBR) penetration might impact the system. Work to date has primarily focused on preparing for the analysis on short-term voltage stability and enabling the analysis by developing a representative dynamic network models.

Next Steps

81. A dynamic model of Northern Powergrid's distribution network has been developed following stakeholder engagement with original equipment manufacturers. The performance of the network model has been validated, and this will be used in the next phase of the project to perform a detailed investigation of short-term voltage stability.

NPG_NIA_059: SafeGrid: Strategic Assessment for Flood Events across the Grid - Active

Background

82. Project SAFEGRID is an innovation project led by Northern Powergrid in partnership with the EIC (Energy Innovation centre) and UDlive to modernise flood risk management across the electricity network. It replaces carbon-intensive, reactive mitigations with a dynamic, risk-based approach that combines updated flood risk modelling, a quantified asset risk matrix, and targeted deployment of real-time flood monitoring sensors. These sensors will enable Northern Powergrid to monitor flood conditions in real time, take earlier and more targeted operational action, and proactively protect assets and vulnerable customers improving resilience, sustainability, and customer outcomes while creating a scalable, UK-first methodology for future rollout.

Key Learnings

83. Locational and historical flood risk data has been successfully collated and validated, supported by a completed workshop with the delivery partner and the wider Northern Powergrid team to align on scope, datasets, and methodology. Flood risk analysis using the latest Environment Agency datasets has been completed for all identified sites and early alignment with delivery partners has clarified scope, data sources, and the methodology to be undertaken.

Potential Benefits

84. The project will transition from reactive, physical flood defences to a proactive, data-driven approach, improving overall efficiency and adaptability. By integrating real-time monitoring with predictive analytics, it will enhance operational decision-making, while enabling more effective allocation of resources by prioritising investment towards the highest-risk and highest-impact sites. This approach will also reduce carbon footprint and environmental impact by limiting the need for carbon-intensive solutions such as concrete flood walls and site relocations. In turn, it will strengthen network resilience and reliability, lowering the risk of customer outages and service disruption during flood events, and establish a scalable, repeatable model for climate risk management within Northern Powergrid and across the wider UK energy sector.

Next Steps

85. Work is now underway on gap analysis to identify increased flood risks or areas with insufficient mitigation, which remains on track for completion by the end of April 2026. In parallel, the project has begun early development of a quantified

risk matrix methodology ensuring outcomes can be effectively integrated into capital works and maintenance programmes.

NIA Project Pipeline

86. We are in the process of mobilising three new NIA projects ahead of the start of the new regulatory year and are taking the opportunity to fully align our ideation pipeline with our ED2 strategic objectives and the outcomes of Ofgem's ENIT, which will publish its challenges in May 2026. The three projects in mobilisation are as follows:

Flex Select (NPG_NIA_060)

87. Although registered in the 2025/26 reporting period, the Flex Select project is in its mobilisation phase at the time of writing. The project will assess current methodologies used by Distribution System Operators (DSOs) to evaluate and allocate flexibility tender bids. It will develop an improved approach for continuous bid decision-making, supported by a computational model to ensure consistent application across future tenders. This will enable more accurate award decisions, provide transparent and auditable accept/reject justifications for Flexibility Service Providers (FSPs), and deliver significant time savings for DSOs. Collectively, these enhancements will support Northern Powergrid and other DSOs in onboarding a greater number of FSPs and progressing towards more complex, shorter-term tendering arrangements.
88. Subject to successful delivery, the decision-making tool will improve the accuracy and transparency of bid awards, offering clear, auditable reasoning for FSP outcomes while significantly reducing the time required for assessment. These efficiencies will enable Northern Powergrid and other DSOs to increase FSP participation and advance towards more dynamic and complex tendering processes.

Loop Detect

89. Around 20% of domestic customers' properties on the NPg network are connected via looped service cables, which can prevent or delay the installation of low-carbon technologies such as EV chargers and heat pumps. Current network data on looped services is fragmented and inconsistent across the two licence areas. As a result, looped services can be discovered late during customer applications, causing delays and extra site visits. The Loop Detect project will seek to improve visibility of looped services using AI trained on trusted GIS-confirmed loop data, combined with additional evidence sources including:

- Smart-meter phase/voltage information
- Digitised historic service cards and Vocon reports
- Customer-submitted photographs
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90. By consolidating these datasets, we aim to create a larger, reliable training dataset that supports a topology-aware AI model capable of predicting looped services where records are currently incomplete. The central hypothesis is that multi-source evidence will enable sufficiently accurate and early identification to support operational decision making..

Hot Ground:

91. Climate change is increasing the frequency, duration, and intensity of heatwaves across Great Britain. While overhead networks are known to be sensitive to extreme temperatures, the impacts of prolonged hot and dry conditions on underground electricity distribution cables are poorly understood and not explicitly addressed in current asset management practices. Existing standards and planning assumptions typically rely on historical climate conditions and simplified soil parameters, providing limited insight into how soil drying, reduced thermal conductivity, and elevated ground temperatures interact to increase the risk of cable overheating and failure. These processes are strongly influenced by antecedent rainfall and resulting soil moisture conditions, which control how effectively heat can dissipate through the surrounding ground. As a result, Distribution Network Operators (DNOs) lack an evidence-based method to identify where future heat-related risks to underground assets are most likely to occur, limiting their ability to plan proportionate, cost-effective resilience measures for customers.

92. The overall aim of HotGround is to develop a robust, evidence-based methodology to identify future heat-related risk “hot-spots” for underground electricity cables, accounting for soil conditions, rainfall-driven soil moisture variability and projected climate change. Key objectives are to:
    - Collate and validate historic fault, soil, and climate datasets to establish observed relationships between heatwaves, rainfall, soil moisture conditions and underground cable performance.
    - Develop and test a thermo-mechanical soil model that translates ambient weather conditions into soil–cable interface temperatures.
    - Apply UK climate projections to quantify how underground thermal risks may evolve under future warming scenarios.
    - Produce spatial risk maps and technical recommendations to support network resilience planning and inform future innovation and investment decisions.
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Network Innovation Competition (NIC) Activities

Community DSO (NPG_NIC_001)

Background

93. The £14.57m Network Innovation Competition Community DSO project sets out a potential new framework for local energy system operation. The approach explores how the distribution network could be organised into hierarchical 'cell' structures at the low-voltage (LV) level, enabling communities to coordinate local generation, storage and demand. Under this model, local participants manage their energy assets within defined capacity limits, supporting both efficient network usage and improved local energy outcomes.
94. The fundamental objective of the Community DSO project is to provide a replicable and scalable methodology that enables local communities, who are connected to a mutual section of the low voltage distribution network, to effectively manage local demand and generation through the coordination of smart local energy systems (SLES).
95. Various tools and methodologies are currently being tested through three live network trials. All learning generated through these trials will be leveraged to inform the specification for the fourth and final project trial. The outputs of the project will enable community groups, and other interested parties, to effectively embed the Community DSO concept into their local area and reap the rewards of energy independence.

96. The key milestones achieved during the reporting period were as follows:

- Mobilisation of the second and third network trials, collaborating with the delivery partners to ensure all technology and associated infrastructure required to deliver the physical trial was defined and implemented ahead of participant recruitment.
- Completion of data capture (April to September 2025) within the first network trial in Dodworth, Barnsley, generating insight that has been leveraged to optimise the within-cell system ready for the current heating season (October 2025 to March 2026).
- The initial stages of community identification and initiation have been mapped in detail for inclusion in the toolkit, the latter stages will be developed based on the insights generated by the ongoing network trials. These stages will capture learning from live delivery, focusing on operational performance, monitoring and evaluation, and the identification of best practice for scaling and replication. They will also provide recommendations for refining the business models and engagement approaches tested in the earlier stages of the project.

Key Learnings

- Residential batteries are more suitable for providing reliable flexibility within the CDSO cell, whereas EV flexibility is constrained by tariff structures and typical daily routines.
- Cloud-based integration approaches/architecture are more reliable than hard-wired connections, however there is still a dependency on interoperability standards and regulations for integration or communication of different LCT manufacturers.
- Older makes/models of LCTs are currently excluded from participating in the CDSO cells, the project is currently exploring the use of manufacturer owned bridging devices to overcome this interoperability issue.
- Control architecture is reliant on LV monitors on the DNO network, there is currently no failsafe for when communication drops and data is not captured for a period of time.

Next Steps

- Development of a functional specification for the fourth network trial, based on insights gathered from the three network trials that are currently ongoing. Trial 4 will ensure the concept of Community DSO can be consistently replicated and scaled up across viable areas of the existing network to maximise the anticipated benefits for DNOs and communities alike.
- Draft toolkit to be tested with the trial delivery partners, selected external users, as well as the fourth and final network trial. Engagement sessions will assess its structure, clarity and usability, and identify areas where additional tools or guidance may be required. Feedback from these sessions will inform the final version ahead of publication towards the end of the project.
- Identification of methodologies for a Community DSO cell to manage additional network constraints (such as voltage) as well as optimising the within-cell configuration to manage demand at the secondary substation level
- Ongoing commercial feasibility analysis will consider customer participation, satisfaction, incentivisation effectiveness, network savings, and wider market impacts. The project will also assess the relevance of recent Elexon code modifications (P415, P441 and P444) for Community DSO participation and settlement processes.

Strategic Innovation Fund (SIF) Activities

97. We continue to expand our project activity through the Strategic Innovation Fund process. Now in our third year of participation, SIF offers new opportunities to collaborate with both DNOs and Gas Distribution Networks on issues of mutual interest.

98. SIF continues to show its potential to develop new partnerships with innovators and deliver projects that will accelerate the transition to Net Zero. Our SIF

portfolio has seen us collaborating with circa. 50 partners from across the industry on 26 projects to date.

99. We continue to support SIF projects led by other networks, and in 2025/26 partnered with fellow DNOs, with UKPN leading Hot Chips, to explore how surplus heat from data centres can be reused via ambient loop heat networks to decarbonise heat, reduce overall electricity demand, and unlock thermal and electrical flexibility through new commercial models, system modelling, and integrated planning between electricity networks, heat networks, and data centre operators.

100. During the year we were awarded funding for 6 further projects in the Strategic Innovation Fund competition. These are summarised in table 3.

Project Name		SIF Cycle	Reference	SIF Funding (£m)	Total Budget (£m)
Project Volt		Cycle 4 Discovery	NPG_SIF_020	0.15	0.17
Social VPP		Cycle 4 Discovery	NPG_SIF_021	0.15	0.17
Forecasting & Planning Regional Digital Infrastructure (FPRDI)		Cycle 4 Discovery	NPG_SIF_022	0.13	0.15
Smart Open Load Visibility Exchange - SOLVE		Cycle 4 Discovery	NPG_SIF_023	0.15	0.17
Power Wheels		Cycle 4 Alpha	NPG_SIF_024	0.49	0.58
Project Volt		Cycle 4 Alpha	NPG_SIF_025	0.50	0.55

Table 3 – SIF projects registered in 2025-26

101. £15.3m in SIF funding has been awarded to projects led by NPg since the fund's inception to deliver projects with a total investment value of £17.4m.

102. As with the NIA project portfolio, learning from the NIC and SIF projects is shared through the ENA Smarter Networks Portal.

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