Network Innovation Allowance Annual Summary

Progress and results from 2016/17

UK Power Networks
Delivering your electricity

ukpowernetworks.co.uk

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Foreword

UK Power Networks is at the forefront of the energy revolution. Our industry is changing at a pace and scale never seen before. It is only by embracing this change and finding different ways of doing things that we will be able to continue to deliver a sustainable and efficient service for our customers.

The electricity system now has more wind and solar generation capacity connected than ever before, enough to even exceed demand at peak generation times in the summer. More than 90% of all solar energy connects directly to distribution networks, placing us at the very heart of the energy revolution.

There are currently over 3,000 generators with a capacity of 8.5GW connected to our three networks, representing nearly 30% of the installed DG across GB. We are proud to have enabled these changes with an 86% customer approval rating, and at the same time as delivering a step change in network reliability for our customers over the last five years.

The pace and scale of change in our industry is increasing. In the last six years, the number of electric vehicles sold increased tenfold from 8,000 to more than 80,000. The electrification of transport is a key growth area, with public transport and fleet electrification to be the short term focus. The reduced cost of storage technology driven by scale on a global level is only likely to increase demand for electric vehicles in the UK. Grid-scale storage continues to be the subject of major interest to developers, manufacturers, construction partners, regulators and government. Over the last 15 months UK Power Networks alone had received over 600 applications to connect storage for a total capacity of 13GW.

In response to our customers, we are actively trialling new operating models and constraint management platforms, to continue preparing our network for more renewable energy as we transition from a Distribution Network Operator to a Distribution System Operator.

Instead of acting as the passive manager of a network of cables and assets, connecting central generators to homes and businesses, we need to become an active manager of a system that enables local communities, renewable generation, small and medium businesses, prosumers and consumers to access the energy and flexibility markets, all whilst making sure the lights stay on.

> “In the first two years of ED1, we have delivered £120m of savings to our customers.”

Our vision is to be the best-performing DNO group between 2015/16 and 2018/19. To achieve that we want to be the most Innovative, which means focusing on three key areas:

- **Future-ready** – a future-ready distribution business providing new services, which meet the needs of tomorrow’s customers
- **Efficient & effective** – the best DNO group in delivering outputs at the lowest cost, which in turn reduces costs for consumers
- **Low carbon ready** – consistently credited as an active facilitator of, and not an obstacle to, the low carbon transition

We are continuing to demonstrate how innovation has played an important role in both driving strong business performance today and enabling the low carbon landscape of tomorrow. We will continue to use innovation to make our service more efficient, safer and sustainable.

As a measure of our innovation performance we monitor and track solutions which are transitioned into business as usual. We have deployed 19 innovative solutions into business as usual in the first 2 years of RIIO-ED1, 11 solutions were reported in our 2015/16 E6 RIGs submissions, and a further 8 solutions reported in the 2016/17 regulatory year. The cumulative benefits of these innovative solutions have added vast value and delivered benefits of £120 million. Our innovation portfolio consists of 34 live projects each selected in response to a key focus area, and aligned to our Innovation Strategy.

The Network Innovation Allowance (NIA) is a vital element to explore how we continue to improve our fundamental role of keeping the lights on, managing safety, and investing efficiently in a resilient network. This report gives you an overview of our innovation projects. I encourage you to provide us feedback, give us your ideas and continue to engage with us.

The Innovation team are available at:
innovation@ukpowernetworks.co.uk

Suleman Alli

Suleman Alli
Director of Safety, Strategy and Support Services

> “We have invested £88m since 2010 into Innovation.”

Innovation facts and figures

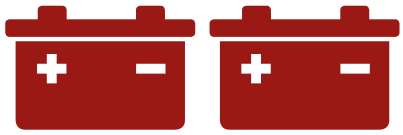
864 Households' worth of CO2 emissions avoided by repairing faults found by the MAAV project

£23.4 million

Investment in innovation underway

SIXTY

Domestic energy storage batteries installed in residential properties with solar PV



3,000

Joints inspected for hidden defects via PD Hawk

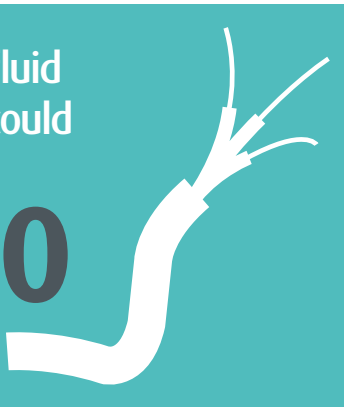
TWENTY-SIX

The number of collaborative, industry wide NIA projects we are involved in

Prototyped a fluid additive that could self-heal over

6,500

km of cables



342

Power sensors installed benefiting customers on 48 feeders with quicker restoration times

60 Employees trained on the newest and latest fault detecting equipment

Innovation at UK Power Networks

Innovation has a crucial role to play in keeping our customers' lights on. It is helping us prepare for a low carbon future while ensuring we continue to improve the service we give our customers today. In a time of significant change in our industry we must continue to evolve to satisfy our customers' expectations.

We have a central innovation team accountable for both how we create and authorise new projects, and for delivering the benefits expected from them. Additionally, we are spreading a culture of Innovation throughout the organisation by working with colleagues from across the business on our portfolio of projects.

We hope this document gives you a brief snapshot into the many benefits we have delivered for our customers through our innovation portfolio. It provides an overview of the key focus areas that we cover and the outputs achieved throughout this regulatory year, which runs from 1 April 2016 to 31 March 2017.

This year we have also included in this report a selection of larger Network Innovation Competition (NIC) funded projects that we are involved in. Our landmark link-up with National Grid on the TDI 2.0 project now known as Power Potential, is looking to help connect more renewable energy to the network and a key project called Powerful-CB is aiming to help energy-efficient combined heat and power generators connect to the network.

This report is therefore designed to allow you to gain more insight into the programme of projects that span the range of challenges and opportunities which electricity networks face.

We hope it gives you an insight into the work we do and inspires you to bring your ideas for innovation to UK Power Networks.

We encourage you to visit our website for full details on all projects within the innovation portfolio.
http://innovation.ukpowernetworks.co.uk

Or please get in touch via email at:
innovation@ukpowernetworks.co.uk

UK Power Networks Innovation team at the 2016 LCNI conference

Putting it into context - Innovation Strategy

Context

UK Power Networks' Innovation Strategy sets out how innovation fits into the overall corporate vision and both why and how we innovate. We advise how our customers benefit, the areas of focus for innovation and what our customers and stakeholders should expect from us during the RIIO-ED1 price control period.

The Innovation Strategy outlines the range of ideas that we explore:

- Projects that focus on continuous improvement, to revolutionary change in the service we deliver to customers; and
- Trialling and rolling out new forms of flexibility within our network, to ensure we build and operate smarter, more capable, reliable networks as a cost-effective alternative to traditional disruptive reinforcement.

Our Innovation Strategy is in line with our corporate vision, which underpins our mission and provides clarity of purpose. A key success indicator in delivering our vision is to be classed as the most innovative DNO, as such innovation is core to how we do business.

A successful innovation programme supports all three elements of our corporate vision; for example, innovation is a central component of our strategy of continuing to be the lowest cost electricity distributor. However, innovation is broader than only cost efficiency and we believe that our commitment to continuous improvement and dynamism through innovation is what our customers should expect from a DNO.

Our vision

At UK Power Networks, we have a clear vision to be the best performing distribution network operator in the UK by 2018. We will achieve this by demonstrating industry leadership in the three areas below:

UK Power Networks' vision is to be:

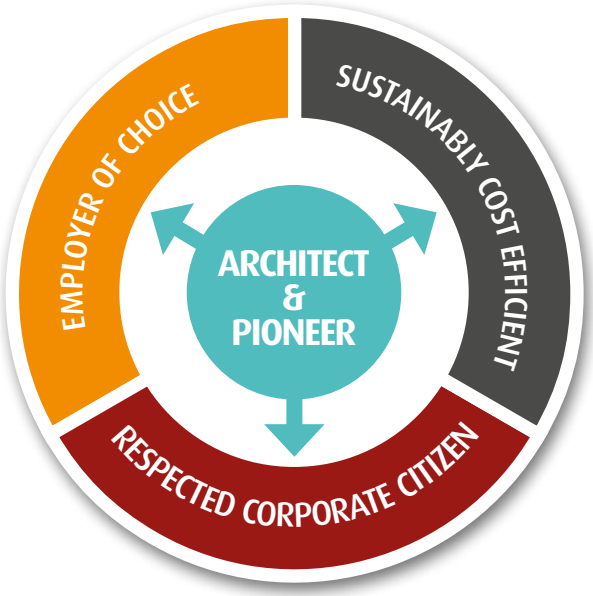
...and consistently the best performing DNO 2015 - 2018/19

What is innovation?

Innovation can have many definitions and interpretations depending on the context and the user. At UK Power Networks, we define innovation as:

The development and implementation of any approach which enables us to achieve our objectives faster, more affordably, safer, or to a higher standard, and which uses methods unconventional in the context of our business.

More simply put, **"To innovate is to be an architect and/ or pioneer"**



Architect and Pioneer figure

Our industry is facing rapid and extensive change and thus innovation is the critical tool with which UK Power Networks must respond. We will only meet our vision of being the best performing DNO group in Great Britain between 2015/16 and 2018/19 by applying innovative thinking.

Below we set out some important traits of innovation that shape our strategy and how we deliver innovation:

- Innovation occurs throughout our business on a day-to-day basis. It is wider than those activities benefiting from innovation funding or those delivered by our central innovation team. We look at best practice and opportunities across our business, from other DNOs and across the world;
- Innovation is more than research and development (R&D), i.e. solutions at a low technology readiness level; many innovative ideas may be highly practical and involve existing technology, but it is the activity or the scale to which we apply them that creates greater opportunities; and
- Innovation involves taking higher risks in order to achieve improvements in performance. This is managed carefully and is accordingly reflected in our rigorous approach to the selection, delivery, and governance of innovation projects. However, this also means that we must recognise that some innovation will 'fail', i.e. not proceed into business as usual. We focus on capturing the learning from such projects and believe that the greater failure would be to always accept the status quo.

All projects are unique, involve some level of ambiguity and will involve some level of change for the business and stakeholders. However, innovation is not the same as change, as not all change projects apply unconventional techniques or accept the risk of challenging accepted practices to deliver value – both of which characterise innovation.

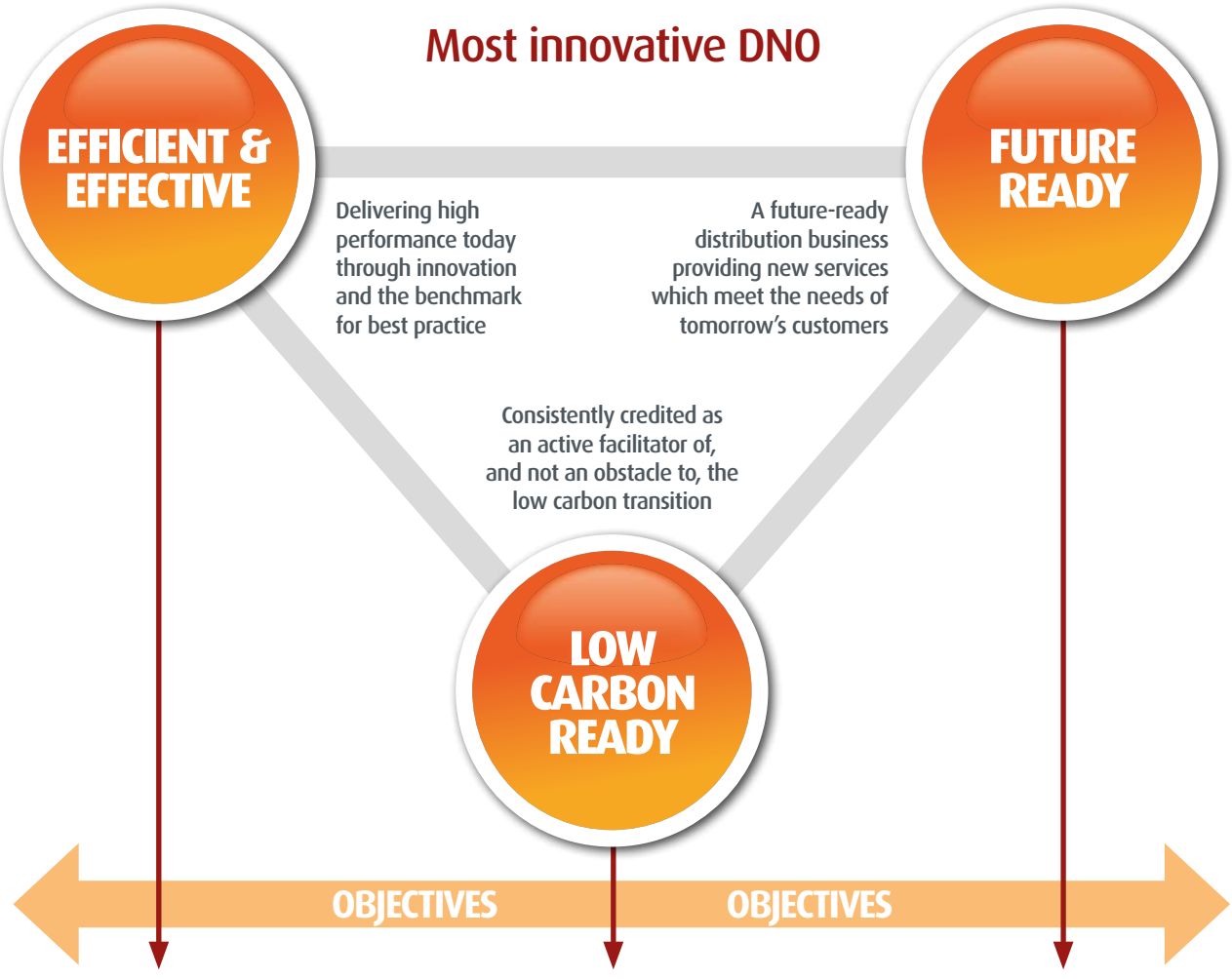
At UK Power Networks we include in our portfolio both:

- **Incremental innovation** – continuous evaluation to achieve gradual improvements of our business efficiency, for example by using small remote-controlled helicopters to carry out overhead line inspections; and
- **Disruptive or transformational innovation** – redefining the way we run our business or network, such as offering entirely new, flexible connection solutions for our distributed generation customers.

Our innovation approach is not restricted to engineering, but covers customer service, health and safety, and procurement to name a few.

Our focus

At UK Power Networks, we understand we need to prepare our business for significant future change. This change will bring about several challenges to our existing business model. Below we identify the focus areas and the associated challenges forecasted.



- **Deliver good business value** - by maximising the smart savings we delivered for customers.
- **Deliver measureable social environmental and safety benefits through our innovation projects** - including customer interruptions (CI), customer minutes lost (CML), carbon emissions and safety performance.
- **Facilitate a low carbon system** - by improving network access through reducing time and cost to connect low carbon load, generation, and storage technologies.
- **Be recognised as a collaborative, thought leader in innovation.**
- **Demonstrate expertise in identifying and delivering the right solutions.**
- **Be the benchmark for innovation and best practice** - by leading trials on DSO.

Project highlights

Domestic Energy Storage and Control (DESC)

Background

This project is intended to provide understanding of the potential impact and opportunities on distribution networks of high uptake of small-scale energy storage – particularly combined with small-scale embedded generation (SSEG) such as solar PV.

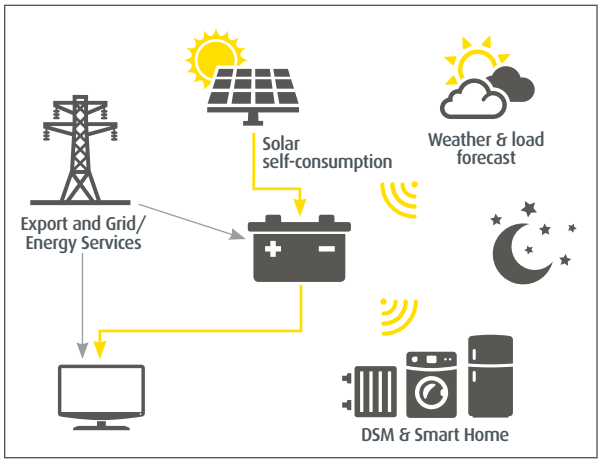
With over 495MW of roof top solar PV installed across UK Power Networks' three licence areas in the last five years, primarily driven by the Feed-in-Tariffs (FiTs), there is a growing interest in battery storage. This is motivated by lower FiTs and cheaper batteries becoming more accessible. Solar PV combined with battery storage reduces a consumer's requirement for grid power and therefore reduces their electricity bills. This uptake will continue to grow as the cost of battery storage falls. Therefore, it is pertinent for UK Power Networks to investigate the likely impacts and opportunities to the network.

Specifically, the project has the following objectives:

- Provide empirical data to inform faster and cheaper installations of domestic batteries to properties with solar PV. This will inform the revision of minimum requirements from the DNO for the installation of Small-Scale Energy Storage (SSES) to domestic properties;
- Characterise the typical load profile of a PV-and-storage-equipped household for modelling the long term effects of SSES on the distribution network;
- Gain insights into customer and DNO value propositions from aggregated SSES applications; and
- Improve DNOs' understanding of the residential energy solutions market.

The project is achieving this by collecting 12 months of data from 60 battery devices installed in residential properties with solar PV – 45 AC-connected battery devices and 15 DC-connected battery devices. For a few months during this period active control trials will be undertaken. These active control trials will seek to quantify the benefit of coordinated control of distributed SSES to the DNO. The project involves British, German and American battery manufacturers.

Experience to date



Installation and monitoring schematic

The project has now recruited 60 participants. This comprises of 35 AC units from British manufacture Powervault, 14 units from German manufacturer Sonnen and 11 units from American manufacturer Tesla. Monitoring has now been installed at 45 of the 60 sites, with the remainder scheduled to be complete by the end of May 2017 at which point the project will transition into the trial operations phase.

A trial design document has been produced in collaboration with project partners which outlines how the data will be analysed to meet the project objectives.

The active control trial design has commenced and will be concluded by July. The active control trial will take place part way through the trial operations phase, currently planned for July – December 2017.

Finally, a literature review has been conducted by Imperial College London (ICL) and a summary document produced.

Future developments

We are now coming into the trial operations phase of the project where data will be collected, validated and analysed to begin to inform the objectives.

Overhead line fault project

Background

Overhead line faults such as faulty pole mounted transformers or failed insulators can take a long time to locate as they are difficult to identify, but once located can be repaired quickly. The use of reclosers has reduced the number of customers affected by a supply interruption, however it is not cost effective to install these in increased volumes on a circuit. As such this project aims to identify the location and distance to a fault to demonstrate that the search time can be reduced and improve customer restoration times. The project has installed Aclara power sensors to measure voltage and current as well as momentary disturbances that will eventually develop into a permanent fault. During the project Aclara will develop a distance to fault algorithm based on the fault current and the decaying voltage during the fault.

Experience to date

Aclara power sensors have been installed on the worst performing circuits that supply customers with the intention of improving the supply restoration times.

- These were installed using live line methods avoiding the need to have a planned supply interruption.
- The sensors send data to a central server that can be viewed by staff in the control room as well as in the operational offices.
- The information provided has reduced the length of overhead line circuit that needs to be patrolled and resulted in faster restorations of non-faulty sections.

Future developments

To enhance the fault information provided by the Aclara power sensors the project will also install fault passage indicators (FPIs) with remote communications that will provide greater visibility of likely fault locations. When a fault occurs, an FPI will send a message indicating it has seen the passage of fault current. These indications will allow the control engineer to direct operational staff to manually operate overhead switches either side of the faulty section and restore customer supplies more quickly. An optimum placement strategy will be developed based on the experience of these trials.

Aclara power sensors connected to 11kV overhead conductors

Insulation of an Aclara power sensor

Mobile Asset Assessment Vehicle (MAAV)

Background

Our low voltage (LV) cable network, comprising of more than 89,446 km of cable, is the last segment of cable connecting our customers to our distribution and the transmission network. When faults occur in this vast network, the results can have negative impacts. Low voltage cable failures can cause loss of supply for customers, and are responsible for significant energy losses. The MAAV project has succeeded in developing a sensor that allows proactive detection of LV fault conditions before they impact customers. The MAAV uses a sensitive electric field detector and advanced signal processing to survey the landscape in search of developing cable faults.

The MAAV sensor before a patrol around Royal Albert Hall

Experience to date

The MAAV completed one survey of the Central London Area in December 2016. A second survey will be completed by July in 2017.

Thus far, the MAAV programme has successfully delivered benefits in several key areas:

- **Improved reliability** – The MAAV pinpoints faulted cables before the faults have interrupted customers
- **Reduced carbon footprint** – The reduction in losses converts directly to a reduction in electricity generation and therefore a reduction of hundreds of tonnes of CO2 emissions

MAAV sensors help track down underground faults

Future developments

The MAAV has demonstrated the capability to support our risk management and asset management processes, while improving customer satisfaction and system performance. These are all key focus areas for UK Power Networks.

The MAAV team are developing a programme for more widespread deployment of the MAAV across our networks. To ensure a successful deployment, the team is also developing training for employees across the company. We are also exploring applications of this technology for our overhead networks.

Faulted cable found during a MAAV survey and replaced

Freight Electric Vehicles in Urban Europe (FREVUE)

Background

Decarbonising freight delivery means there is a potential for an increased demand on the distribution network to supply electricity for electric vans and trucks.

The objective of this project is to assess and characterise the demand of large freight EVs and quantify the potential impacts on local energy distribution infrastructure from a larger scale deployment. This has been achieved by monitoring and assessing freight EV charging at several demonstrator locations across Europe – particularly a logistics depot in central London with 20 freight EVs.

Scope of the project:

- Collect data to facilitate the assessment of the impact freight EVs have on distribution networks;
- Analyse the data to inform understanding of the opportunities and impact of freight EV charging; and
- Establish working groups to communicate lessons learnt in different areas.

Benefits of the project include:

- **Network performance:** the data on charging activities has provided insight into the nature of the additional load from large EVs and will allow better design and management of the networks that support them.
- **Environmental:** the solutions that can be developed and informed by this project will, in the long term, lead to the support of the proliferation of large EV fleets. This in turn will reduce the environmental impacts.
- **Knowledge transfer**: the understanding gained in this project and the subsequent vehicle based trial will benefit a wide audience in the UK and the wider international community.

Experience to date

The project successfully fitted and commissioned monitoring systems at the London trial site and analysed the data which was collected over a one year period. This data was collected using three-phase smart meters, which allowed us to characterise the charging profile of the freight EVs.

UPS 3.5 tonne electric vehicle

The analysis of the trial data highlights that fleet EV operators with heavy-duty cycles (i.e. the use of the EVs is inseparably linked to the core business activity) have fairly consistent demands for charging loads.

This conclusion has informed UK Power Networks' view on the opportunity for offering flexible connections to EV fleet operators, which we are now pursuing as a follow-up project. It has also provided insights on reinforcement needs for fleet operators and informed our stakeholder engagement strategy.

Future developments

We are now pursuing the development of advanced network analysis tools to make assessments on the network capacity available for other freight EV users. This will enable us to offer timed connections, which we can offer where the power demand from the customer, e.g. an EV fleet operator, is fairly predictable and limited to fixed time windows in the day. The connection offer will match this demand with troughs of demand on the power network to facilitate cheaper and quicker connections for our customers.

Vertical Transition Straight Joints Innovative Inspection

Background

Historically, in London, joints were installed inside the substation in a vertical position adjacent to the switchgear to avoid excavating the footpath. At UK Power Networks we have approximately 4,000 sites in the London Power Networks (LPN) area that contain two of these Vertical Transition Straight joints (VTSJs) per site.

In the recent years, we have experienced failures in these joints that cause disruption to our customers. Additionally, there was no mobile or remote method to detect and identify pre-fault or fault condition of these VTSJs on the 11kV network.

We have developed a device called 'Cable Canary' that can detect early degradation of cable joints by using partial discharge techniques allowing us to intervene before the joint fails and avoid disruption to our customers. This allows us to identify cable joints at higher risk of failure and arrange controlled, planned replacements.

Experience to date

A cable joint was taken out from the network to the EA Technology labs to understand the level of electrical discharges coming out from the joint and the level at which the cable joint fails. Based on these tests and our experience on partial discharge (PD), we developed a prototype of Cable Canary which was installed to run two field trials in ten LPN substations. These trials were conducted to understand the typical noise readings within the substation environment such that we are able to filter them out from PD readings.

Cable Canary device that monitors vertical transition joints within substation using partial discharged techniques

During the trial, a cable joint within the substation in London was identified by the prototype as giving high electrical discharges and early signs of degradation. The joint was removed from the network for analysis in the lab and confirmed the early degradation of paper inside the cable joint. After replacement, the PD level at this site was reduced to a low level, confirming the correct diagnosis of an impending fault and validating the technology of Cable Canary to identify high risk HV cable joints.

Future developments

The prototype network trials have been completed and results show the automatic rejection of noise levels in Cable Canary is successful. The method is suitable for deployment at larger scale. The successful detection of a substantial PD source on the network and its removal has contributed to safe operation of the network.

Once fully developed the final product Cable Canary will go into production to roll out into business as usual.

Powerful-CB

Background

Powerful-CB will use advanced power electronics technology to develop a new type of circuit breaker that is 20 times faster than existing ones. This high speed operation provides extra protection for the electricity network, allowing many more highly efficient Combined Heat and Power (CHP) units to connect before the network needs to be upgraded.

At the moment, most of London's power is generated in power stations outside of the capital, which also generate heat, but this is sent up the chimney into the atmosphere. The London Plan aims for a quarter of London's heat and power to be generated in the capital by 2025, which could save more than 2.5 million tonnes of carbon dioxide a year.

It is expected this will lead to a large increase in demand for the connection of CHP units, which are highly efficient in generating heat and power at the same time (combined heat and power). This means they use less energy than conventional energy systems in meeting the same energy demand.

However constraints that this rapid change could cause on the electricity distribution network could make that target hard to achieve safely without prohibitively expensive infrastructure upgrades – or advances in technology.

London will become the first city in the world to host the Powerful-CB device, which could revolutionise the way energy is distributed, and could help keep down electricity connection costs for CHP customers.

We are working with two technology partners to develop two types of fault-limiting circuit breaker (FLCB). ABB will develop a FLCB for use at a primary substation, known as Method 1. Applied Materials (AMAT) will develop an FLCB for use at a customer's premises, known as Method 2. We believe Method 1 will be the world's first demonstration of an FLCB with a fast commutating switch. Method 2 will be GB's first demonstration of an FLCB, at a customers premises. We are also working with Frazer-Nash Consultancy (FNC) and Imperial Consultants (Imperial College) to develop the safety cases for these devices.

Experience to date

We have finalised and published an FLCB technical specification, which defines the technical requirements for both Method 1 and Method 2 FLCBs. We can provide this document to other network licensees upon request.

We published the safety case processes and principles document (bit.ly/pcb-sc-process), which explains how we will develop the safety case for FLCBs. We believe this is the first document of its kind produced for a GB network licensee. This document contains information that will be useful to other network licensees who need to develop a safety case for an innovative technology or operational practice.

Future developments

In the first year of the project we will:

- Develop a preliminary safety case for the use of FLCBs;
- Develop a FLCB network design standard;
- Complete feasibility studies on a sample of primary substation sites;
- Commence site selection and preliminary design for the Method 1 trial site;
- Recruit a customer to trial Method 2; and
- Hold customer dialogue sessions and publish SDRC 9.3.1 (Understanding customers' requirements) in October 2017.

Budget	£6.2m
Start/End Dates	January 2017 to August 2021
Project Partners (contributions)	ABB, Applied Materials
Project Suppliers	Frazer-Nash Consultancy, Imperial College London

TDI 2.0 - Transmission and Distribution Interface 2.0 (Power Potential)

Background

The capacity to connect more low carbon energy resources in the South East of England is nearing the limit due to upstream constraints in the transmission network. These constraints have been driven by the significant increase of distributed generation connected in the distribution system as well as new interconnection capacity projects to France and Belgium. Further capacity in the transmission network can be achieved by either significant investment in the infrastructure or with innovative non-build solutions.

The Power Potential project aims to address these challenges on the transmission network and provide additional network capability for the distribution network. To achieve this, it will develop technical and commercial solutions to maximise the use of distributed energy resources (DER) to manage transmission voltage and thermal constraints. The project lead by National Grid System Operator in partnership with UK Power Networks is estimated to create financial benefits for consumers by saving from £1m by 2020 to £29m by 2050 as a result of deferred investment in the transmission network.

It will also create additional network capacity to enable UK Power Networks to connect a further 3,720 MW of distributed generation in the area by 2050.

This £9.56m project is funded by the Network Innovation Competition (NIC) mechanism with National Grid and UK Power Networks each contributing £750k. The project will be delivered in the phases described below in the figure below:

Experience to date

The project, which started in January 2017 has focused on defining the high level design of technical and commercial features. The cornerstone of the project is to deliver both reactive and active power services to National Grid from DER via UK Power Networks. Thus, one of the first high level design decisions was to map how these services could work technically in order to design the adequate commercial framework around it. The project has also focused on the process of selecting the software provider which will enable the services being coordinated by UK Power Networks and provided to National Grid.

Budget	£9.6m
Start/End Dates	January 2017 to December 2019
Project Partners (contributions)	National Grid
Project Suppliers	TBC

Future developments

Following on from the software provider selection, the detailed design phase will commence and will see the design options finalised both commercially and technically. These findings will be summarised in the project detailed commercial and technical design report (SDRC 9.2) due in January 2018. In parallel, we will work with interested parties to understand their needs, questions and feedback with regards to the project's design developments.

A full list of our projects

Our Network Innovation Allowance Portfolio

Capital Efficiency

Project Reference	Project Name	Research Area	Start-Ends	Budget
NIA_UKPN0001	Power Transformer Real Time Thermal Rating (RTTR)	High Voltage Networks	06/2014 - 01/2017	£1,522 ,000
NIA_UKPN0011	Small Bore Cable Replacement Technology	High Voltage Networks	09/2015 - 04/2017	£1,114,650
NIA_UKPN0014	Solid Cable Replacement Prioritisation	High Voltage Networks	09/2015 - 02/2017	£141,056
NIA_NGET0088	Transformer Research Consortium	Safety, Health and Environment	04/2013 - 10/2017	£1,050,000
NIA_UKPN0013	Underground HV Cable Research	High Voltage Networks	09/2015 - 03/2017	£932,477
NIA_UKPN0022	Global Earthing Systems (GES)	Network Operations, Comms and IT	03/2017 - 03/2019	£483,000

Connections

NIA_UKPN0004	Freight Electric Vehicles in Urban Europe (FREVUE)	Low Voltage and 11kV Networks	03/2013 - 09/2017	£74,310
NIA_UKPN0018	Efficient Network Constraint Management Through the use of Market	Various	06/2016 - 08/2017	£250,000
NIA_ENWL003	Review of Engineering Recommendation P2/6	High Voltage Networks	01/2015 - 09/2016	£650,000

Driving Sustainable Networks

NIA_UKPN0021	Domestic Energy Storage and Control (DESC)	Energy Store and Demand Response	09/2016 - 06/2018	£625,000
NIA_SSEPD0026	Management of Plug-in Vehicle Uptake on Distribution Network	Energy Store and Demand Response	03/2016 - 01/2018	£430,000
NIA_WPD_008	Improved Statistical Ratings for Distribution Overhead Lines	Network Operations, Comms & IT	07/2015 - 01/2018	£747,554

Environment

NIA_NPG_009	Development of Oil-filled Cable Additive	Safety, Health and Environment	03/2016 - 06/2017	£180,000
NIA_UKPN0012	Pressurised Cable Active Control and Monitoring	High Voltage Networks	09/2015 - 11/2017	£1,075,600

Operational Efficiency

NIA_UKPN0009	Composite Shell joint Retrofit Trial	Low Voltage and 11 kV Networks	09/2015 - 05/2017	£186,000
NIA_UKPN0017	Optimising Overhead Line Conductor Inspection and Condition	High Voltage Network	04/2016 - 01/2018	£1,520,431
NIA_UKPN0016	RoadMender Reinstatement Trial	Low Voltage and 11 kV Networks	01/2016 - 01/2017	£493,106

Reliability and Availability

NIA_UKPN0003	Smart Urban Low Voltage Network (SULVN)	Low Voltage and 11 kV Networks	12/2009 - 03/2017	£5,383,409
NIA_UKPN0006	The Prediction of Weather-Related Faults	Network Operations, Comms & IT	05/2015 - 08/2016	£128,310
NIA_UKPN0002	Directional Earth Fault Passage Indicator Trial	Low Voltage and 11 kV Networks	01/2014 - 01/2018	£483,764
NIA_UKPN0019	OHL Fault Location Concept & Directional Earth Fault Passage Indication	Low Voltage and 11 kV Networks	05/2016 - 09/2018	£2,585,000
NIA_UKPN0023	Harmonic Effects on Network Assets (HENA)	High Voltage Networks	03/2017 - 06/2018	£441,000
NIA_UKPN0005	Better Spur Protection	Low Voltage and 11 kV Networks	04/2014 - 10/2017	£492,000

Safety

NIA_UKPN0007	Detection of Broken/Low Hanging Overhead Line Conductors	Safety, Health and Environment	02/2014 - 12/2017	£737,900
NIA_UKPN0015	Tunnel Data Capture Enhancement	Various	11/2015 - 05/2017	£240,000
NIA_UKPN0020	Mobile Asset Assessment Vehicle (MAAV)	Safety, Health and Environment	07/2016 - 01/2018	£544,322
NIA_UKPN0010	Vertical Transition Straight Joints Innovative Inspection	Low Voltage and 11 kV Networks	09/2015 - 07/2017	£899,396

#GoodToGreat

If you would like to get in touch or provide feedback, please email us innovation@ukpowernetworks.co.uk

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