



# Network Innovation Allowance Annual Summary 2018/19

July 2019

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## 2018/19 NIA Annual Summary

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### Revision Record

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## Introduction

1. This report has been prepared by Northern Powergrid to inform interested parties of the innovation activities of its electricity distribution licensees, Northern Powergrid (Yorkshire) Electricity Distribution plc, and Northern Powergrid (Northeast) Ltd. It covers the period from 1 April 2018 to 31 March 2019.
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 focuses upon research and development work eligible for Ofgem's Network Innovation Allowance (NIA) however some details of our other activities are given where necessary to provide a broader context for some of the innovation being undertaken within the company. Innovation is funded through a variety of routes including other price control revenues, specialist industry funding sources (e.g. Innovate UK) and participation with universities (funded by UK research councils).
4. The report has been prepared in accordance with standard condition 46 of the electricity distribution licence, the associated Regulatory Instructions and Guidance (RIGs) and the Electricity Network Innovation Allowance Governance document. In particular the obligations specified in sections 6.6 and 6.7 relating to the requirements for an annual summary of NIA activities.

## Progress of Innovation Activities

5. For the second year in a row we have expended the whole of our Network Innovation Allowance. This reflects the ongoing uplift in innovation activity initiated in 2017/18. The large increase in new projects during that year means that the number of projects started during 2018/19 has been lower with a total of 4 initiated. This is reflective of maintaining the portfolio and intensity of activity as opposed to the ramping-up previously experienced. For the reporting year Northern Powergrid has participated in 30 separate NIA projects. 9 of these are collaborative projects with at least one other GB electricity distribution network operator (DNO) or gas distribution network (GDN) operator.

6. We have at least one collaborative activity with each of the other DNOs. We also have similar activities with some GDNs plus two water companies (Yorkshire and Northumbrian Water). This is very much in line with the view expressed in our innovation strategy; we would seek to undertake joint activities wherever possible, both for improved learning and project quality and to maintain good cost control. The trend direction over the last year has been for an increasing number of project activities to be undertaken on a collaborative basis and with the increased relevance of whole system thinking we anticipate that this will continue.
7. We are also increasingly engaged in early discussions with other licensed entities during the design phase of their projects. This type of collaboration is not necessarily very visible but provides valuable exchange of learning between the various network operators.
8. We continue to seek cross-vector projects and consider that the future needs for decarbonisation and for general efficiency will require whole energy system solutions. Identification of appropriate projects is difficult due to the need to balance the costs and benefits across different energy vectors. The cross-vector Integrel project will begin to deliver meaningful outputs during the next year and we are hopeful that this will lead to further activity in this area.
9. The following table shows all of the projects which have been active during the reporting period:

	Reference	Project Type
Integrated substation Condition Monitoring (ISCM)	NIA_NPG_002	Northern Powergrid activity
Development of An Improved Distribution Load Estimates Methodology	NIA_NPG_004	Northern Powergrid activity
Activating Community Engagement (ACE)	NIA_NPG_005	Northern Powergrid activity
FORESIGHT – LV pre-fault recognition and management	NIA_NPG_007	Northern Powergrid activity
Development of Oil-filled Cable Additive	NIA_NPG_009	EIC Collaboration, NPG lead
Pollywood - Alternative wooden pole system for OHL	NIA_NPG_010	Northern Powergrid activity
Distributed Storage & Solar Study (DS3)	NIA_NPG_011	Northern Powergrid activity
Improving Demand Forecasting	NIA_NPG_012	Northern Powergrid activity
Measuring the Societal Impact of Network Activities	NIA_NPG_013	EIC Collaboration, NPG lead
Vehicle to Grid (V2G) - the network impact of grid integrated vehicles	NIA_NPG_014	Northern Powergrid activity
Geospatial PV Mapping	NIA_NPG_015	EIC Collaboration, NPG lead
Silent Night - Hybrid EV Generator	NIA_NPG_016	Northern Powergrid activity
Integrel - Baseline Implementation	NIA_NPG_017	NPg/NGN Collaboration
Micro-Resilience	NIA_NPG_018	Northern Powergrid activity
Customer-Led Distribution System	NIA_NPG_019	Northern Powergrid activity
Smart Network Design Methodologies	NIA_NPG_020	Northern Powergrid activity
Holistic Fault Anticipation	NIA_NPG_021	Northern Powergrid activity
Drones Within Visual Line of Site (Drones WWLOS)	NIA_NPG_022	Northern Powergrid activity
AutoDesign: LV Connections Self Service Tool	NIA_NPG_024	Northern Powergrid activity
Lightning Prediction	NIA_NPG_025	Northern Powergrid activity
Resilient Homes	NIA_NPG_026	Northern Powergrid activity
Centrallock Remote Access Management System	NIA_NPG_027	Northern Powergrid activity
Pragmatic Security	NIA_NPG_029	Northern Powergrid activity
Switchgear Enhanced Ratings	NIA_NPG_030	Northern Powergrid activity
Health Index Study of Electrical Energy Storage Systems within Electricity Networks.	NIA_NPG_031	Northern Powergrid activity
Assessment & Testing of Alternative Cut-outs	NIA_UKPN0029	ENA Collaboration, UKPN lead
Low Cost Fault Current Measurement of Wooden Poles	NIA_SPEN_0025	EIC Collaboration, SPEN lead
Environmentally Acceptable Wood Pole Pre-treatment Alternatives to Creosote (APPEAL)	NIA_SPEN0008	EIC Collaboration, SPEN lead
Harmonic Effect on Network Assets (HENA)	NIA_UKPN0023	ENA Collaboration, UKPN lead
Eye in the Sky	NIA_WWU_0045	EIC Collaboration, WWU lead

10. The table identifies those projects where we are sole participant or, where we are working alongside other licensees, 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 on the ENA Smarter Networks Portal.
11. In addition to these activities we also continue to participate in several activities in a supporting role, either as engineering consultants providing insight into the network compatibility issues or acting in a more active steering role. These projects

are not formal NIA funded activities but are important in allowing us to influence the development activities of others and to stimulate the market.

12. Internally, within Northern Powergrid, additional innovation is also being undertaken. Our Smart Grid Implementation team is installing improved network monitoring and control systems. This is increasingly providing a valuable platform that will facilitate future innovation and business improvement. Where appropriate we are prioritising this investment roll-out to support current innovation activities.
13. In the area of data we are now members of the Open Data Institute we are using the benchmarking opportunities that this provides to identify and extract data from the large quantities of data that we hold. These are not necessarily NIA funded but are, nevertheless, innovative activities.
14. We are also taking part in the preparation of a Network Innovation Competition proposal alongside SSEN. This project, which is complementary to our running Microresilience project, is a third party suggested implementation of microgrids for improved, and more economic, network resilience. The project was identified through the ENA open call for third party NIC proposals conducted alongside the other DNOs and GDNs.
15. We also continue to benefit from the advantages of being part of a broader international organisation, Berkshire Hathaway Energy (BHE). Exchange of innovative ideas, best practice and other learning from an organisation with very similar technology but with a different perspective significantly enhances the quality of our overall innovation portfolio. We now actively participate in a variety of corporate activities to enhance this collaboration.

## Innovation Strategy Delivery

16. Our innovation strategy contains four strategic objectives that remain highly relevant:
  - the creation of a smarter powergrid;
  - the introduction of smart meters;
  - continued growth in web-based and digital-enabled services; and
  - issues of affordability.
17. Further, the priority areas identified in the innovation strategy are:
  - Network environmental footprint (including safety);
  - Network reliability and availability;
  - Network management and flexibility;
  - Demand side response (including customer flexibility);
  - Network planning and design;
  - Communications and engagement;
  - IT enabled process improvements; and
  - Social obligations
18. The bulk of our current activities remain focussed on the first five of these priority areas. These areas represent key engineering strands of our innovation requirement that have been in place for several years.

19. Social obligations was one area with lower activity. Where possible we have addressed this as collateral outcomes in other projects. As an example the DS3 project has been helping elderly customers whilst we develop an improved understanding of domestic electricity storage and photovoltaic generation. The new Resilient Homes project is however aimed directly at improving support for the most vulnerable priority service customers.
20. All active projects except the Integrated Substation Condition Monitoring (ISCM) have been initiated under NIA. ISCM is proving difficult to complete in the way originally envisaged however it is intended that the project will be completed and the outcomes disseminated this year whatever.
21. Supporting our strategic objectives, network and customer flexibility are key areas of transition for the electricity system in general and network operators in particular. During this year we have delivered our initial DSO plan which anticipates an evolutionary path which will pass through smarter grids and increased flexibility and move onwards to new distribution services. Whilst many of the required changes are likely to be supported from normal network evolution several areas of particular interest have been identified as priorities for further NIA work.
22. We are increasingly ensuring that the projects we initiate are aligned towards the future energy system and the developing requirements of our customers.
23. The collection of projects that includes the Customer Led Distribution System (CLDS), Microresilience, DS3 and the new Resilient Homes project are all a part of this trajectory and are mutually supporting projects in terms of their outputs.
24. Silent Power, the gamification aspects of Activating Customer Engagement, the BEIS funded e4Future project and our internal activities on electric vehicle (EV) charger installation form another cluster of projects to support EV roll-out. A further project to investigate the impact of increasing penetration of low carbon technologies on LV network design, which supports this further, will be initiated early next year.
25. We have continued to support the EIC during 2018/19 as we have done since its inception in 2008. This is an activity undertaken in collaboration with the majority 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.
26. With other EIC members we have undertaken a study to develop improved methods for measuring innovation activity and progress. A balanced score card type methodology has been developed and piloted during this year. We hope to develop this further alongside our EIC partners. This activity sits outside of our NIA portfolio and has been funded separately although the same ethos of shared learning and shared funding has been adopted.
27. The costs of running the EIC have been distributed across the running projects identified from this activity. We see the EIC as an increasingly important forum for the identification and implementation of cross-vector, cross-utility projects.
28. The first pan-utility project, Measuring the Societal Impact of Network Activities, through the Northern Utilities Joint Innovation Group (NJUIG) and managed by the EIC was completed during the year. NJUIG supports the innovation needs of Infrastructure North and consists of representatives of Yorkshire and Northumbrian Water as well as Northern Gas Networks and ourselves. We are currently seeking further areas of mutual interest for additional projects although the group also provides excellent opportunities for lower intensity benchmarking and knowledge exchange.
29. We have continued to develop and enhance the role of our Innovation Steering Group. This is now an executive level group with membership that includes our CEO and other directors of Northern Powergrid.

## Learning

30. The annual 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 in detail.
31. 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.
32. Significant learning has been disseminated from the Activating Customer Engagement project during this year. Methods of directly engaging with domestic customers, individually and through community groups, were developed. Further interesting conclusions on the use of gamification and the application of serious games thinking to demand side management were gained.
33. We continue to use the ENA Electricity/Energy Innovation Forums to disseminate project learning as it occurs. This has been used to disseminate the learning from the Pollywood project and from the DS3 project during 2018/19.

## Summary of 2018/19 Network Innovation Allowance Investment

34. We can also summarise the total network innovation allowance spending for the reporting period across the two Northern Powergrid licence areas:

<b>Eligible Project Spending (external)</b>	£3,419,772
<b>Eligible Project Spending (internal)</b>	£838,192
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<b>IFIEt, Grand Total</b>	<b>£4,257,964</b>

35. This is a similar figure to 2017/18 (£4,108,867) and represents the maintenance of our ambition to ensure that the ED1 annual allowance is fully utilised.
36. Internal spending represents 20% (cf 15% 2017/18) of the total investment. This is below the governance maximum limit of 25%.