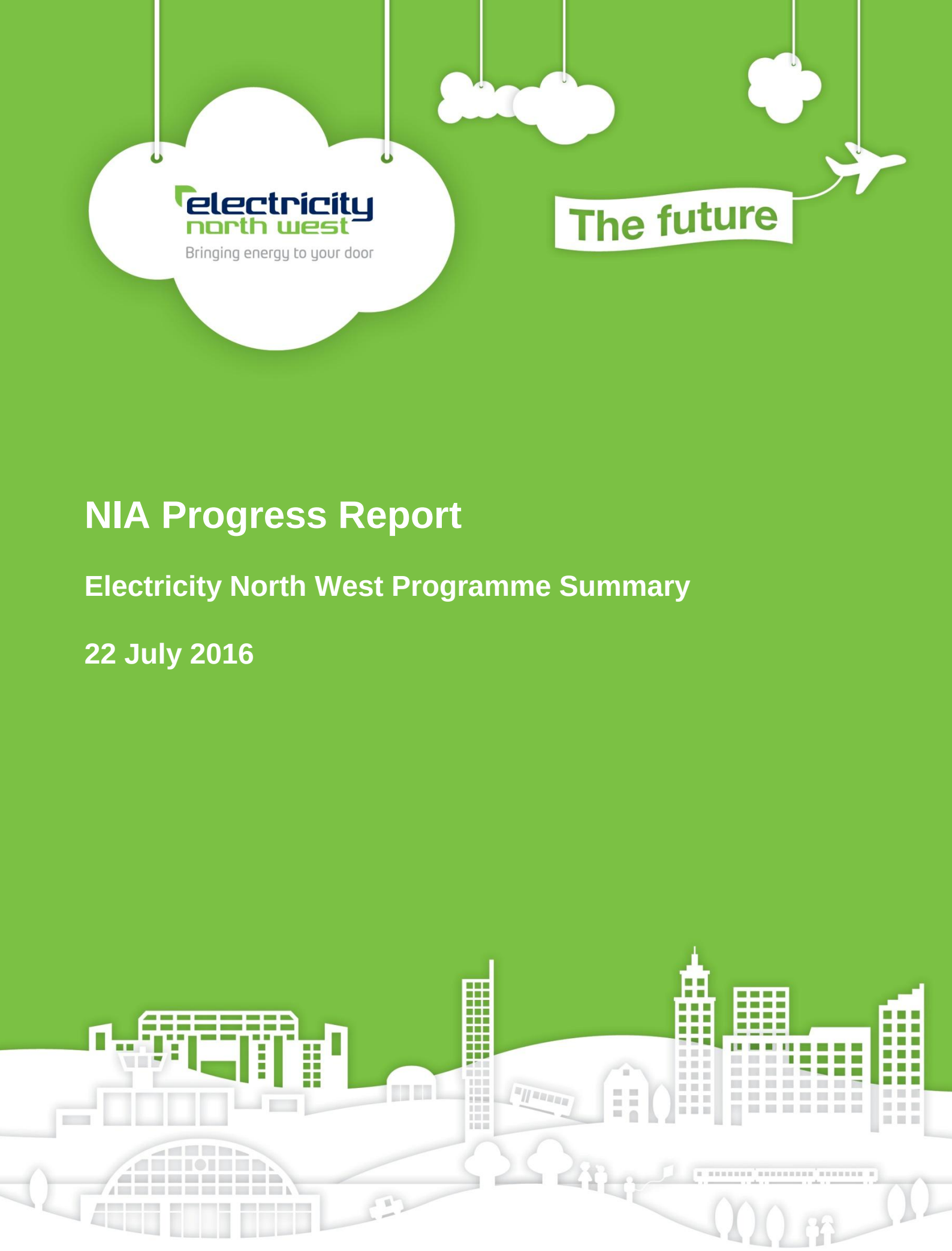


NIA Progress Report

Electricity North West Programme Summary

22 July 2016

VERSION HISTORY

Version	Date	Author	Status	Comments
V1.0	20/07/16	A Howard	Final	Final version following internal review and comment

REVIEW

Name	Role	Date
D Randles	Engineering Strategy Manager	21/07/16
P Turner	Future Networks Delivery Manager	21/07/16

APPROVAL

Name	Role	Signature & date
Steve Cox	Head of Network Engineering	Steve Cox Digitally signed by Steve Cox DN: cn=Steve Cox, o, ou, email=steve.cox@enwl.co.uk, c=GB Date: 2016.07.22 14:01:43 +01'00'

CONTENTS

1 EXECUTIVE SUMMARY

We are delighted to present this summary of activities and learning from our projects funded under Ofgem's Network Innovation Allowance (NIA). In this summary we share some of our findings from our new projects, further information on which can be found in the associated annual reports which we have prepared for each of our NIA funded projects.

As this was the first year of NIA, our activities were mainly focused on ensuring that our previous IFI and First Tier LCN Fund projects were successfully closed or transitioned to the new NIA arrangements; and on initiating a number of new projects which reflect the aims of our Innovation Strategy.

In the first year of NIA we have registered 16 new projects and we have been named as funding licensee on an additional five projects. These are projects which will benefit from networks working together to solve common challenges.

Many of our projects are in their early stages and as a consequence have very little detail to report. No registered projects have been completed in the period. However, a number will be completed in the next few months. We are constantly learning as our projects progress and we highlight much of the significant learning in this summary and provide sign posts to where further information can be found.

In March 2016 we published an updated and significantly enhanced Innovation Strategy. The presentation of the strategy has been improved to make it easier for customers and stakeholders to understand the challenges we face and the exciting opportunities that are available through new technology and innovation. The strategy provides a clear link between our values, the drivers for our innovation objectives and our project selection and delivery. It also includes a simple one page summary for each of our innovation projects.

The innovation strategy, this summary, the NIA project reports and many other supporting documents are easily accessible on the innovation pages of our website.

In the next year, our focus will be to deliver our current programme of work to its stated aims, objectives and success criteria; and we will continue to develop a number of additional innovation ideas into new projects, some of which will be discussed with our stakeholders using the engagement methods described in our strategy.

2 INNOVATION STRATEGY

Electricity North West published its updated Innovation Strategy in March 2016 with a refreshed format designed to make it more accessible to our stakeholders and to demonstrate a clear and logical link from our high level objectives to our individual projects.

Innovation is key to the success of our organisation. We seek to innovate continuously across our business activities to ensure that we not only meet our obligations to our customers but also respond to their evolving needs and expectations. We are the leading network operator in innovation, providing flexible services at affordable prices. We have a well established track record for innovation and we will continue to build on this as we move forward.

Figure 1: Our strategy

Our continuous improvement journey is led by the needs of our customers. Our approach to innovation is underpinned by the following three guiding principles:

- We aim to understand and respond to the changing needs of customers
- We seek collaboration with partner organisations to work together to find innovative solutions to common problems
- We involve customers in our innovation work, ensuring that potential innovative solutions deliver customer benefits.

We will not commit our customers' money to a project until we validate that the technology is likely to be economically viable and that the problem can be resolved within the timescale of our business plan. This ensures that we focus on the projects most likely to deliver real value to customers in the near to medium term.

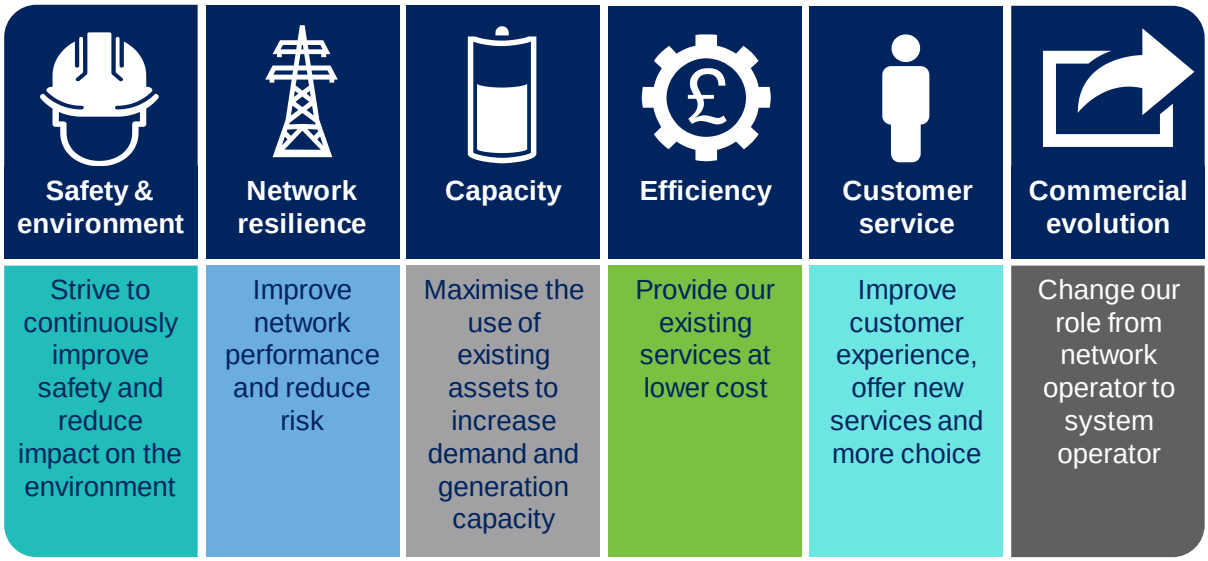
Our updated strategy outlines the challenges we face, the opportunities available to us and our involvement with our stakeholders to help us to decide which projects are of value to both Electricity North West and our customers.

The strategy demonstrates the "innovation lifecycle" and how we develop ideas from various sources into projects and then ultimately transfer to business as usual.

Figure 2: Innovation lifecycle

To ensure we have a balanced portfolio of projects and are thus using our innovation resources to achieve the best overall outcomes for our customers, we have identified a number of key innovation themes which relate to these challenges and to our business plan. Each of our projects is designed to support one or more of these themes which is demonstrated in the one page summary of the individual projects contained in the Innovation Strategy

Figure 3: Key innovation themes



Safety and environment

We will pursue opportunities to continuously improve the safety of our customers and our people and reduce the impact of our operations on the local and wider environment.

Network resilience

We will reduce customer interruptions and customer minutes lost by improving the performance of network and reducing risk.

Capacity

We will maximise the use of our existing assets to increase the provision of demand and generation capacity.

Efficiency

We will strive to provide our existing services to customers as efficiently as possible and at least cost.

Customer service

We will improve customer service and develop our network to be as flexible as possible to offer new services and greater choice.

Commercial evolution

We will support the evolution of distribution network operators to distribution system operators, with responsibility for balancing the regional electricity network by encouraging all network users to contribute to the efficient operation of the network and managing arrangements for efficient investment decisions.

3 PROGRAMME OVERVIEW AND PROGRESS APRIL 2015 TO MARCH 2016

The following projects have been registered on the smarter networks portal and have an annual report available on the portal and our own website.

Figure 4: NIA projects led by Electricity North West

Project							Joint	Timescales	Duration								
									2014	2015	2016	2017	2018	2019	2020	2021	2022
Demand Scenarios with Electric Heat & Commercial Capacity Options		✓	✓	✓			No	May 2015 – Oct 2016		■	■						
Distribution Asset Thermal Modelling			✓	✓			No	Jul 2015 – Jan 2017		■	■	■					
P2/6 Rewrite		✓					Yes (ENW lead)	Jan 2015 – March 2016		■	■						
Combined Online Transformer Monitoring				✓			No	Sep 2014 – Sep 2017	■	■	■	■					
Asset Risk Optimisation	✓	✓		✓			No	Jul 2015 – Jul 2017		■	■	■					
Sentinel	✓	✓		✓	✓		No	Sep 2015 – Sep 2019		■	■	■	■	■			
Reliable Low Cost Earth Fault Detection for Radial OHL Systems	✓	✓		✓	✓		No	Oct 2015 – Oct 2017		■	■	■					
ATLAS		✓	✓	✓			No	Oct 2015 – Nov 2017		■	■	■					

Project							Joint	Timescales	Duration								
									2014	2015	2016	2017	2018	2019	2020	2021	2022
Cable Health Assessment – Low Voltage	✓	✓		✓			No	Nov 2015 – Nov 2018									
Value of Lost Load				✓	✓		No	Oct 2015 – Jan 2017									
Enhanced Voltage Control		✓		✓	✓		No	Nov 2015 – Nov 2018									
Investigation of Switchgear Ratings	✓	✓	✓	✓			No	Dec 2015 – Dec 2016									
Detection of Islands	✓			✓	✓		No	Dec 2015 – Jun 2018									
Optimisation of Oil Regeneration				✓			No	Feb 2016 – Feb 2022									
Tapchanger Monitoring	✓			✓			No	Feb 2016 – Feb 2020									
Future Network Modelling Functions			✓	✓		✓	No	Mar 2016 – Sep 2017									

Find out more about all our NIA projects on our website.

Project NIA-ENWL003 – Review of Engineering Recommendation P2/6 was registered by Electricity North West but the majority of the work is delivered through a dedicated ENA working group chaired by Electricity North West.

The following projects have been registered, led and reported by other organisations, but are supported by Electricity North West.

Figure 5: NIA projects supported by Electricity North West

Project							Joint	Timescales	Duration								
									2014	2015	2016	2017	2018	2019	2020	2021	2022
Reactive Power Exchange Application Capability Transfer (REACT)		✓	✓	✓			Yes (NGC lead)	May 2015 – May 2017		■	■	■					
Smart Grid Forum workstream 7 DS2030			✓	✓		✓	Yes (NGC lead)	Jul 2014 – Sep 2015	■	■							
Improved Statistical Ratings for Distribution Overhead Lines			✓	✓			Yes (WPD lead)	Jul 2015 – Jan 2018		■	■	■	■				
Environmentally Acceptable Wood Pole Pre-treatment Alternatives to Creosote (APPEAL)	✓						Yes (SP EN lead)	Mar 2016 – Sep 2018			■	■	■				
Management of plug in vehicle uptake on distribution networks			✓	✓	✓	✓	YES (SSE lead)	Mar 2016 – Jan 2018			■	■	■				

All projects are progressing to plan and timeframe with no major modifications. A number of projects are nearing completion; closedown reports for these projects will be issued and made available on our website. The individual project progress reports reflect the depth of work completed, which in some cases invariably means that a number of the more recently registered projects have little to report as the project is still in an initiation project phase.

Our projects reflect a variety of delivery mechanisms and a wide range of partner engagement from business and customer experts, technology producers and developers as well as industry bodies and collaborations.

4 AREAS OF SIGNIFICANT NEW LEARNING

We have observed a number of areas of significant new learning during the first year of NIA, related to project and programme level experience.

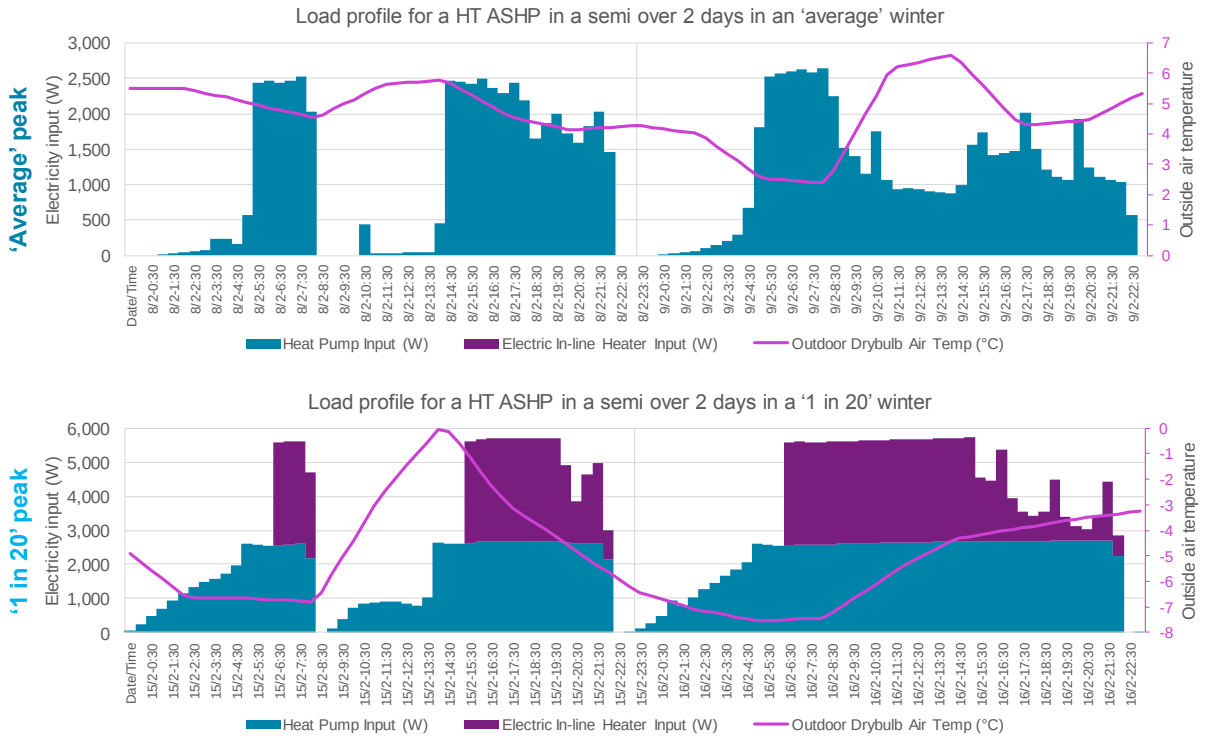
In addition to the learning gained from NIA projects highlighted below, we have been learning from four Second Tier / NIC projects and transitioning a fifth project to business as usual. The learning gained is shared at dissemination events and on our website and influences all projects in which we are involved.

Key learning from specific NIA projects includes:

Network planning

Domestic heat pump profiles generated by one of our projects have been offered to EA Technology for the next update of the Transform model. A recommendation from this project is to consider planning the network for a '1 in 20' winter peak rather than an 'average' winter peak which would mean an additional 5.5 kW load per heat pump rather 2.2 kW as currently used, shown in Figure 6 below.

Figure 6: Example load profiles for heat pumps: Higher temperature ASHP in a semi on 2 days in an 'average' winter & 2 days during a '1 in 20' winter



The Demand Scenarios NIA project has exposed the limitations of focusing on the single half-hour or winter/summer peak demand. This learning is being incorporated in the NIA project 'ATLAS' which expands the scope of load forecasting from winter peaks to year-round behaviour.

As forecasting tools become more complex, the accuracy and complexity of data required increases and consequently the raw data processing, processes and error-correction systems need to improve.

When developing new modelling techniques it is important to be aware of other projects in this area which may be using alternative approaches to ensure that a consistent solution is obtained.

Network/asset management

Clusters of electric vehicles are more likely to cause a short-term failure on a distribution transformer rather than a reduction in the long-term asset life.

Oil regeneration holds significant benefit to extend asset lives, however, significant learning opportunities still exist to optimise the oil regeneration process and to build a quantitative evidence base.

Work to date suggests it may be possible to improve the functionality of overhead line fault passage indicators without the need to provide a reference voltage to the unit, simplifying the application of these devices.

Asset management by risk optimisation can deliver additional savings but still requires a human sense check of the model outputs to ensure that the work programme remains deliverable.

Modelling risk presented by individual assets and groups to a common framework to prioritise various interventions is possible but becomes more problematic with complex or inter-dependant assets.

Stakeholder engagement

Learning showed that positive engagement with wider national stakeholder groups is difficult to achieve and maintain. This will require the development and testing of different engagement approaches.

Engaging customers remains challenging; customer education on the roles and responsibilities of a DNO is always a precursor in every engagement exercise.

Customers who have little or no experience of low carbon technologies, have little comprehension of the scale of change that is likely to occur.

Knowledge exchange

We have worked with partners across all our projects to educate them in our systems of work and business processes. This is essential in defining solutions that are compatible with our operations.

BAU transition

Our learning to date is helping us to understand the boundary between the end of Innovation funding and the start of the new business as usual activity. This includes the monetary boundary and the ownership and delivery of the new process or solution.

Summary

We recognise the significant learning that will flow from this exciting funding opportunity and although still in the early stages we are already able to report some findings from our new NIA projects. We expect this learning to grow as our projects progress which will enable us to deliver the anticipated benefits to our customers.