WESTERN POWER DISTRIBUTION

INNOVATION

NEXT GENERATION NETWORKS

LV CONNECT AND MANAGE

WPD_NIA_014

NIA MAJOR PROJECT PROGRESS REPORT

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Prepared by:	Samuel Jupe	02/10/2018
Reviewed by:	Matt Watson	12/10/2018
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02/10/2018	0.1	Initial Draft
12/10/2018	0.2	Draft Following Review
31/10/2018	1.0	Final

Contents

1 Executive Summary

LV Connect and Manage is funded through Ofgem's Network Innovation Allowance (NIA). LV Connect and Manage was registered in April 2016 and will be complete by March 2019.

LV Connect and Manage aims to demonstrate and prove that LV Active Network Management (ANM) can be used as a short-term measure, whilst network reinforcement takes place, to facilitate the timely connection of customers. The solution can then be redeployed to another area when the need case arises. The ANM solution can also provide a long-term alternative to network reinforcement in cases where the investment in traditional assets is not economically viable or other reasons (such as the disruption to customers) prevents reinforcement taking place. In order to maintain the highest standard to service to its customers, WPD plans to connect them as quickly and cost effectively as possible and then actively manage them, once connected.

This report details progress of the project, focusing on the last six months, April 2018 to September 2018.

1.1 Business Case

This project demonstrates a specific piece of new (i.e. unproven in GB, or where a Method has been trialled outside GB the Network Licensee must justify repeating it as part of a Project) equipment (including control and communications systems and software).

1.1.1 Carbon Benefit

LV Connect and Manage will facilitate the increased uptake of LCTs, enable the potential for higher-powered connections and reduce the time taken to connect customers.

The LV Connect and Manage solution will allow LCTs to connect to the network up to 9 months more quickly than traditional network reinforcement alternatives. This is based on a deployment timescale of up to 3 months for LV Connect and Manage technologies and up to 12 months for traditional network reinforcement. At least £13,500 of carbon savings per customer could be unlocked by the LV Connect and Manage solution. This is based on the LV Connect and Manage technologies enabling a conservative 438kWh of electricity generation from PV, during the nine-month period whilst network reinforcement takes place (i.e. a 3.7kW PV installation with a 10% capacity factor, generating electricity for 4 hours a day, with a conversion factor of 0.49426 and a non-traded price of carbon of £62/tCO2e).

Based on the expedited connection of several PV clusters (three or more customers), the project will have a major carbon benefit, grading it as 5, as published in the ENA NIA Benefits Guide (i.e. over £30,000/tCO2e will be saved).

1.1.2 Cost Benefit

LV Connect and Manage will implement a novel control system for demand side response of electric vehicles and battery energy storage, facilitating the control of bi-directional power flows.

Base case cost: £3,300 - £6,600 per LCT customer.

The typical cost of reinforcing an LV feeder is £40,000, based on ground mounted substation and cable upgrades, as published by WPD in the East Midlands Quotation Accuracy Scheme (QAS) (part of the Connection Charging Methodology). EATL's My Electric Avenue suggests that 44.4kW clusters of LCTs would be sufficient to trigger the reinforcement of an LV feeder. On a per-feeder basis, this is equivalent to:

- 12 EV slow chargers or 12 PV systems (3.7kW per charger or PV installed capacity) or a £3,300/LCT customer reinforcement cost.
- EV fast chargers (7.4kW per charger) or a £6,600/LCT customer reinforcement cost.

LV feeder reinforcement would not necessarily be financially viable for smaller clusters of LCTs.

Method cost: £1,300 - £3,300 per LCT customer

The cost of deploying the LV Connect and Manage Solution is £1,300 - £3,300 per customer, including communications, controls, installation, operation and maintenance, and assuming the technology is re-deployed at least 3 times (for nine months) during the equipment lifetime.

Considering only a single deployment of the LV Connect and Manage solution, the equipment would cost £3,900 - £10,000 per LCT customer. Taking into account the carbon savings enabled by an expedited connection, the solution would generate benefits in excess of the Method cost in 3 – 7 months.

If the LV Connect and Manage equipment is re-deployed only three times during its lifetime (i.e. once the network has been reinforced, the LV Connect and Manage equipment is available to be re-deployed elsewhere), the equipment costs would reduce to £1,300 - £3,300 per LCT customer. In this case, the solution generates carbon saving benefits, in excess of the Method cost, in 1 – 2.5 months. This is significantly quicker than the expected time to reinforce the LV network.

Financial benefit: The financial benefit ranges from £2,000 per customer (low base case cost and method cost with 12 LCT customers per feeder) to £3,300 per customer (high base case cost and high method cost with 6 LCT customers per feeder).

1.2 Project Progress

This is the fourth progress report. It covers progress from April 2018 to September 2018.

During this reporting period, the installation of equipment in customers' homes was completed, enabling system-wide field trials to take place. During the field trials, the power exported by multiple PV-battery-inverter systems and the power imported by multiple EV fast charge points was controlled based on real-time monitoring of the upstream distribution substations.

The portability of the Domestic Load Controller solution was trialled and it was shown that the equipment can easily be commissioned, swapped-out and decommissioned by any qualified electrician (i.e. no specialist skills are needed for the customer-facing activities).

This project has been presented at a number of events, this is detailed in section 2.5.

During the final six months of the project, the LCT equipment ownership will be handed over to the customers participating in the trials. In addition, efforts will focus on the activities to transition the LV Connect and Manage solution into WPD's BaU activities and wider dissemination of the project outputs amongst the DNO community.

1.3 Project Delivery Structure

1.3.1 Project Review Group

The LV Connect and Manage Project Review Group meets on a bi-annual basis. The role of the Project Review Group is to:

- Ensure the project is aligned with organisational strategy;
- Ensure the project makes good use of assets;
- Assist with resolving strategic level issues and risks;
- Approve or reject changes to the project with a high impact on timelines and budget;
- Assess project progress and report on project to senior management and higher authorities;
- Provide advice and guidance on business issues facing the project;
- Use influence and authority to assist the project in achieving its outcomes;
- Review and approve final project deliverables; and
- Perform reviews at agreed stage boundaries.

1.3.2 Project Resource

WPD: Project Lead

- Mikhail Prokhnich (Current Project Manager, Handover to Ricky Duke in Q4)Nortech Management Limited: Project Delivery Support and Active Network Management Control System Equipment supplier
- Samuel Jupe (Project Delivery Manager and Technical Lead for ANM)
- Simon Hodgson (Technical Lead, Technologies and Communications)
- Sid Hoda (Technical Lead, IT and Hosting)

The Big Wheel: Customer Engagement (Nottingham)

- Helen Hemstock (Lead)

The Dairy: Customer Engagement (Milton Keynes)

- Nigel Rowlson (Lead)

EV Charging Solutions: EV charge point supplier and electrical installer (Nottingham)

- Chris Everitt (Lead)

Stratford Energy Solutions: Battery/Inverter supplier and electrical installer (Milton Keynes)

- Jason Savidge (Lead)

1.4 Procurement

The following table details the current status of procurement for this project.

Table 1-1: Procurement Details

Provider	Services/goods	Area of project applicable to	Anticipated Delivery Dates
Nortech	Project delivery and ANM Equipment	All	Goods: All goods produced. Delivery scheduled according to customer demand Services: On-going until 31/03/2019
The Big Wheel	Customer Engagement	Engagement in Nottingham	01/01/2017 – 31/03/2019
The Dairy	Customer Engagement	Engagement in Milton Keynes	01/01/2017 – 31/03/2019
EV Charging Solutions	Supply and install of EV chargers and DLCs	Customer Installations and Support	01/06/2017 – 31/03/2019
Stratford Energy	Supply and Install of Battery/Inverters and DLCs	Customer Installations and Support	01/06/2017 – 31/03/2019

1.5 Project Risks

A proactive role in ensuring effective risk management for LV Connect and Manage is taken. This ensures that processes have been put in place to review whether risks still exist, whether new risks have arisen, whether the likelihood and impact of risks have changed, reporting of significant changes that will affect risk priorities and deliver assurance of the effectiveness of control.

Contained within Section 7.1 of this report are the current top risks associated with successfully delivering LV Connect and Manage as captured in our Risk Register. Section 7.2 provides an update on the most prominent risks identified at the project bid phase.

1.6 Project Learning and Dissemination

Project lessons learned and what worked well are captured throughout the project lifecycle. These are captured through a series of on-going reviews with stakeholders and project team members, and will be shared in lessons learned workshops at the end of the project. These are reported in Section 5 of this report.

The LV Connect and Manage Project has been disseminated at a number of events and through papers written. Details of this can be found in section 2.5.

The outputs from the LV Connect and Manage project will be disseminated at WPD's up-coming 'Balancing Act' Conference, taking place in Bristol in November 2018.

2 Project Manager's Report

2.1 Project Background

The LV Connect and Manage Method involves the deployment of communications and control infrastructure to allow LCTs to connect to the network in a timely manner and be managed in an active way. This will involve, limiting the power exported by LCTs to the network at times of LV network congestion or increasing the power demand of LCTs (heat pumps, energy storage and/or EVs) to keep the network within technical limits.

2.2 Project Progress

LV Connect and Manage is being delivered in three phases:

1. Mobilisation (including the procurement of equipment and services, and production of the customer engagement and data protection plans). This phase runs from April 2016 to September 2017.
2. Connect and Manage Trials (including the recruitment of customers to participate in the trial and the installation of equipment in customers' premises and WPD's distribution substations). This phase runs from May 2017 to October 2018.
3. Analysis, Dissemination and Close Down (including the analysis of results from trials and an evaluation of the LV Connect and Manage solution). This phase runs from January 2018 to March 2019.

2.3 Phase 1: Mobilisation

Progress within this reporting period and next steps

Not applicable – this project phase is complete.

2.4 Phase 2: Trials

Progress within this reporting period

In April 2018, detailed planning of the LV Connect and Manage trials took place and a trialling methodology was established to evaluate the import limitation of power to EV customers in West Bridgford and the export limitation of power from PV/battery storage customers in Furzton. The trialling methodology involved the following steps:

1. Review of customer uptake on a substation-by-substation basis to determine the locations of the largest clusters (to maximise the learning from the trials);
2. Review of technologies and communications (to confirm that customers' technologies had been installed/commissioned correctly and were controllable);
3. Preparation of correspondence with customers, outlining the planned trials and goals;

4. Communication with customers (to ensure they were aware that trials were taking place);
5. Trialling of the LV Connect and Manage solution on a system-wide basis:
    a. For the PV / battery storage trials, sunny days were chosen due to the high-level of solar insolation. This maximised the combined effects of PV generation and battery energy storage discharge on power export (and its limitation). As part of the trials, the customers' battery storage equipment was temporarily switched from 'self-consumption' to 'grid export' mode;
    b. For the EV trials, the LV Connect and Manage system was set up to run continuously through September and October, maximising the learning from continuous operation of the system;
6. Review of the results and application of enhancements to increase the learning from trials.

In May 2018, Grasscroft was selected for the PV / battery energy storage trials and the customer correspondence was produced and distributed.

In June 2018, an initial trial of the LV Connect and Manage solution was carried out using the Grasscroft substation. At this stage, the battery technology in 12 / 17 customers' homes was available to control. The battery technology was not available for control in five customers' homes due to the state of charge being less than 10%. The battery technology has its own systems in place to limit discharge below 10% and prevent deep discharge.

In July 2018, a report on the initial Grasscroft trials was produced and the trial planning methodology was implemented for the EV trials (with Rugby Road being selected).

In August 2018, the teething issues with the Grasscroft customers' technologies were resolved.

In September 2018, the Grasscroft trials were repeated with participation from the full suite of customers and the Rugby Road trials commenced.

Connecting and Managing EV Charge Points in Customers' Homes

During this reporting period, live trials were conducted to manage the level of EV charging in customers' homes through peak loading times of the day.

A typical installation is shown in Figure 2-1. This comprises the controllable EV charge point (bottom) and the Domestic Load Controller (DLC) box (top). The DLC box communicates with the EV charge point using the Open Charge Point Protocol (OCPP) over Ethernet. The charge point receives signals with a 1A granularity in the range 16A (3.7kW) to 32A (7.4kW). The DLC box communicates to the system-wide ANM platform using DNP3 over GSM (3G) and relays the maximum charge signal to the EV charge point based on the real-time monitored loading of the distribution substation feeding the cluster of EV customers.

Figure 2-1: Example Installation of Project Equipment: A Controllable EV Charge Point and Domestic Load Controller

The operation of the LV ANM system for managing the charge of a cluster of EV customers is shown in Figure 2-2. In this case, a cluster of 16 customers, each with a 32A (7.4kW) charge point is connected to a single distribution substation. The real-time loading of the distribution transformer is shown using the red trace. The artificial limit applied to the transformer to trigger ANM operation and throttle back the EV charge is shown using the green trace.

As the electrical loading increases through the peak time of 16:00 to 19:00, the headroom for EV charging decreases and corresponding set points are given to each charge point to limit the rate of EV charge and mitigate potential overloads through the distribution transformer. The headroom for EV charging is dynamic and optimised to according to the real-time loading of the transformer. From 20:00 onwards, the base load on the transformer reduces and the EVs are able to access the full 32A (7.4kW) charge.

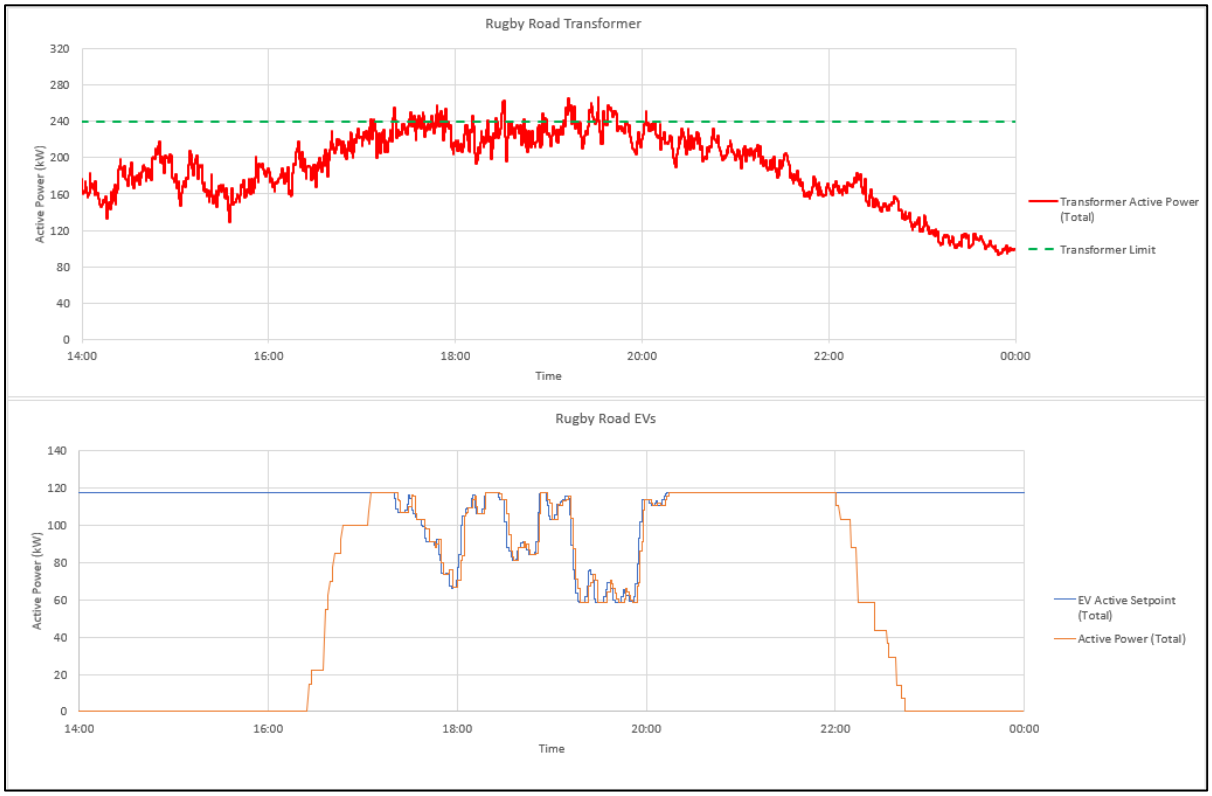


Figure 2-2: Demonstration of Managed EV Charging at Multiple Customers' Homes through Peak Loading Times

Connecting and Managing Battery Energy Storage Systems in Customers' Homes

During this reporting period, trials were conducted to manage the level of battery power export into the distribution network from customers' homes through peak PV generation times of the day.

A typical installation is shown in Figure 2-3. This comprises the battery with controllable inverter (top) the DLC box and the battery/inverter communications interface unit (bottom). The DLC box communicates with the battery/inverter system using the Modbus over Ethernet. The battery/inverter system receives signals with a 0.5kW granularity in the

range 0 – 3.5kW. The DLC box communicates to the system-wide ANM platform using DNP3 over GSM (3G) and relays the maximum discharge signal to the battery/inverter system based on the real-time monitored loading of the distribution substation feeding the cluster of PV customers.

Figure 2-3: Example Installation of Project Equipment: A Controllable EV Charge Point and Domestic Load Controller

The operation of the LV ANM system for managing the power exported by a cluster of PV/Battery customers is shown in Figure 2-4. In this case, a cluster of 16 customers, each with a 3.5kWp (7kWh) battery system and various installed capacities of PV is connected to a single distribution substation. The real-time loading of the distribution transformer is shown using the red trace. The artificial limit applied to the transformer to trigger ANM operation and limit the power exported onto the network is shown using the green trace.

Due to the relative size of the PV/battery systems compared to the load demand on the network (i.e. the minimum load is much larger than the generation), it was not possible to create reverse power flow conditions. Instead, an artificial limit was applied to the distribution transformer to create the equivalent behaviour – the distribution transformer must deliver no less power than the limit applied.

As the electrical loading decreases through the peak time of PV generation, the battery power exported onto the network is automatically decreased so that the transformer loading is maintained above the limit. If the penetration of PV and battery systems increased to such a level that power flows through the distribution transformer were reversed, the system could be set up to limit battery discharge and thus mitigate the potential for reserve power flow. Alternatively, the power exported by the battery systems could be increased during peak loading times to feed power demands locally and increase the efficiency of operation of the LV network.

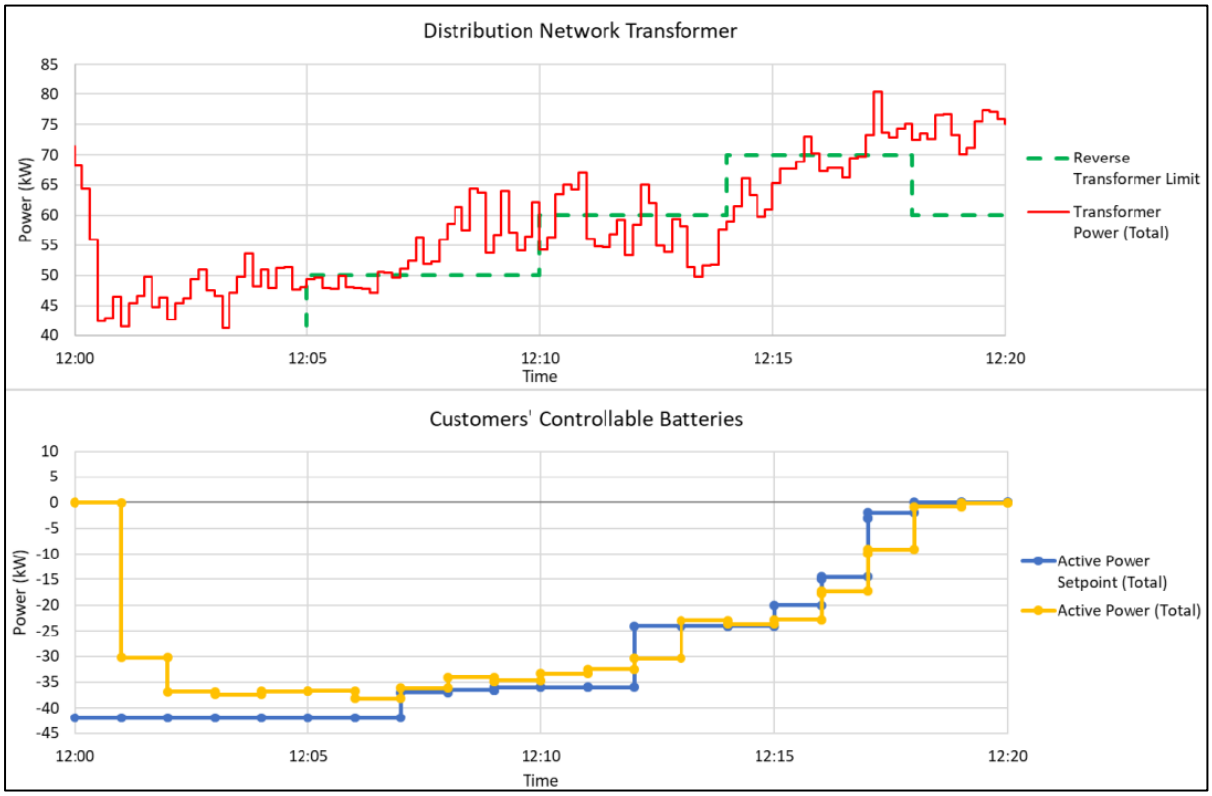


Figure 2-4: Demonstration of Managed Battery Energy Storage Systems at Multiple Customers' Homes

Solution, Portability and Scaling

As seen in Figure 2-5, a dashboard view summarises the status of the various ANM schemes and allows the system to be deployed at scale. The system user receives at-a-glance information regarding the constrained/unconstrained operation of schemes, their health/alarm status and whether or not any schemes are disabled.

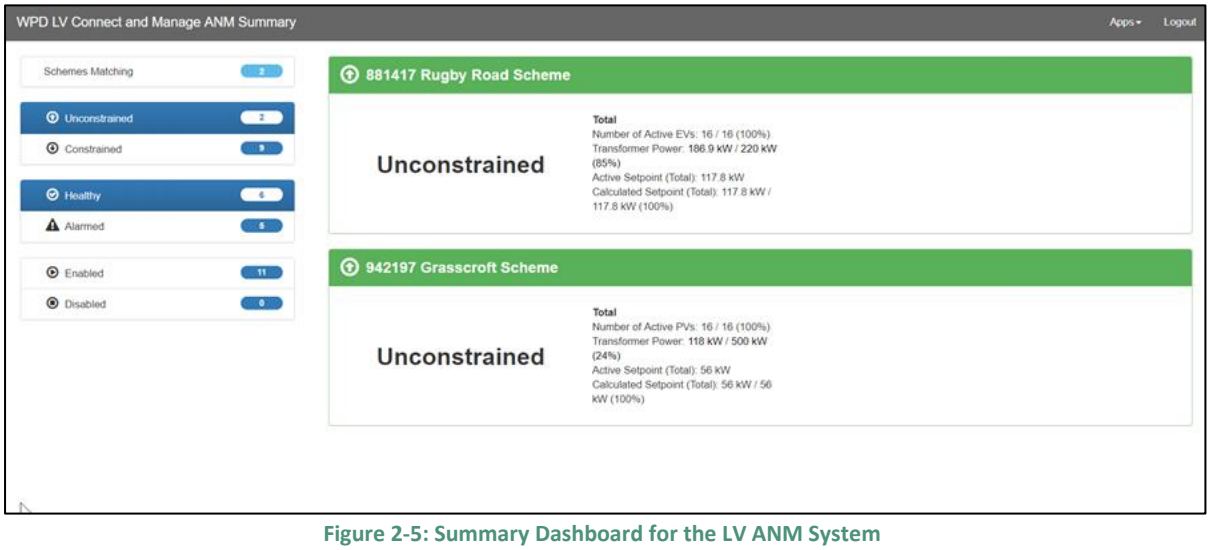


Figure 2-5: Summary Dashboard for the LV ANM System

Next steps

The trialling phase of the project will conclude in October 2018. Throughout October, the system to manage EV charge points will run continuously and data will be gathered for analysis and dissemination in Phase 3 of the project.

2.5 Phase 3: Analysis, Dissemination and Close Down

Progress within this reporting period

During this reporting period, project activities were disseminated in a number of ways:

1. The functional specification of the Domestic Load Controller and standard data point profile for an EV Charge Point (to enable managed charging) was provided to Scottish and Southern Electricity Networks (SSEN) for inclusion in their NIA Project "Smart EV" (developing a communications and connection framework for connecting Smart EVs on to LV networks).
2. Western Power Distribution hosted the Members of Parliament (MPs) for Milton Keynes and Milton Keynes South, demonstrating the equipment installed in the distribution substation and customers' homes.
3. Western Power Distribution and Nortech Management Limited delivered a paper and presentation on LV Connect and Manage at the International Workshop on Electricity Distribution, which took place in Ljubljana, Slovenia, in June 2018.
4. LV Connect and Manage has been short-listed for an award in the Residential Energy Storage Project of Year category at the Solar Power Portal / Energy Storage News Awards, taking place in October 2018.
5. LV Connect and Manage was used as a reference case study for the implementation of Active Distribution Systems in the UK, as part of CIGRE UK's national webinar series.

In addition to wider dissemination of the project within WPD, as part of its transition into BaU activities, a paper has been submitted for inclusion in the 2019 International Conference on Electricity Distribution (CIRED) and CENEX LCV has been commissioned by WPD to produce a white paper on the LV Connect and Manage solution.

Next steps

The next steps within this phase of the project are to:

1. Conduct a comprehensive analysis of the battery/inverter and charge point control systems (including benefits unlocked for WPD and its customers);
2. Disseminate the project findings at WPD's 'Balancing Act' Conference, taking place in
   The Nissan Leaf used for testing of automated charge control
3. Facilitate customer workshops to handover the ownership of equipment before project close down;

4. Plan out and implement the steps to transition the LV Connect and Manage solution into WPD's BaU activities; and
5. Produce the Close Down Report for the project

3 Progress against Budget

Spend Area	Budget (£)	Expected Spend to Date (£)	Actual Spend to Date (£)	Variance to expected (£)	Variance to expected %
WPD Project Management and Equipment Installation	87,673	87,673	97,125	+9452	+10.8
Project Delivery	179,940	164,178	164,178	0	0
Communications equipment	133,000	133,000	142,225	+9,225	+7
Monitoring	55,140	55,140	54,620	-520	-1
Control	362,969	331,445	331,445	0	0
Customer Engagement and Dissemination	125,080	121,485	121,485	0	0
Project Equipment (EV Charge Points and Battery / Inverters)	161,162	161,162	168,901	+7,739	+4.8
Installations and Decommissioning	107,441	107,441	112,600	+5,159	+4.8
Dissemination	17,000	16,350	16,350	0	0
TOTAL	**1,278,750**	**1,177,874**	**1,208,929**	**31,055**	**6**

Comments around variance

1. Overspend due to significant change in GBP/EURO exchange rate when purchasing communication equipment.
2. Overspend due to additional investments in LV substation monitoring device upgrade for trial purposes.

4 Progress towards Success Criteria

LV Connect and Manage aims to achieve the following:

Success Criteria	Status
Demonstration of the active management of low carbon technologies (energy storage and electric vehicles) by controlling load profiles and alleviating electricity network constraints.	✓ This has been successfully demonstrated on the live trials that have been carried out, refer to section 2.4.
Development of a replicable architecture for the LV ANM solution, which can be utilised by WPD in their other Licence Areas and by other DNOs, more generally.	✓The domestic load controller has proven its capabilities within the live trials, and Nortech are currently working to make a smaller unit that could be mass produced with the view to this unit being deployed anywhere on any network.
Development of novel business processes for deploying ANM technologies into LV networks. (This will include the specification and development of an installation guide for the LV ANM technologies).	This is something that will be produced during the final stage of the project once the live trials have been completed.

The project continues on track to meet all its success criteria.

5 Learning Outcomes

The following learning outcomes resulted from activities during this reporting period:

5.1 Customer Propositions

A number of customer testimonials were received, supporting the goals of LV Connect and Manage; this has given us valuable learning as to the customer acceptance of the technology and the acceptance of having that technology managed. The testimonials are as given below:

“We were happy to sign up as it seemed such an obvious thing to do with having panels already in place. It means we can now store energy to use later in the evening when the sun is not shining… the system is working perfectly - saving us money, helping the environment and providing the WPD team with useful feedback on how we use it all.”

- Customer Participating in Furzton Trials

"I first became aware of the WPD Connect and Manage project when Nigel Rowlson from The Dairy Marketing Agency approached us here at Milton Keynes Council.

We arranged a meeting as the council is always keen to support initiatives that contribute to our long-term sustainability goals. We have rolled out a variety of energy saving programmes in recent years and we saw this as an important trial that would also benefit residents directly.

Nigel gave us the background to the project and the framework that he and his partners wanted to work within. It matched our expectations exactly so we were delighted to give it our blessing and be quoted on the marketing literature and website. We also put the information out through our own social media channels.

It’s great to know the project is succeeding with the year-long trial now in progress and some initial results having been fed back to the WPD team.

We look forward to working with WPD on initiatives like this in the future."

- Geoff Snelson, Director of Strategy and Futures at Milton Keynes Council

“We are a city renowned for innovation and I’m delighted that WPD has chosen Milton Keynes as the place to trial the project. It has clearly had a positive impact on the local residents so far and I look forward to seeing the outcome at the end of the trial.”

- Mark Lancaster, MP

“It was good to talk with residents partaking in the trial. Whilst it is early days they were impressed with the initial savings in their electricity costs and the benefit to the environment.”

- Iain Stewart, MP

5.2 IT Systems

LV Connect and Manage has demonstrated the successful system-wide control of EV charge points (limiting power import based on real-time network monitoring) and the system-wide

control of battery/inverter systems (limiting power export based on real-time network loading).

Trials were successfully carried out, and we learned that we could run full automated control of EV charge point power imported in to customers' homes from the grid. Charge throttling followed a given setpoint, calculated and dispatched by the ANM system in response to the transformer power flows.

We also learned through successful trials with the batteries that we could run and demonstrate full automated control of battery export from customers' homes in to the grid. Battery output followed a given setpoint, calculated and dispatched by the ANM system in response to the transformer power flows, as seen in Figure 5-1.

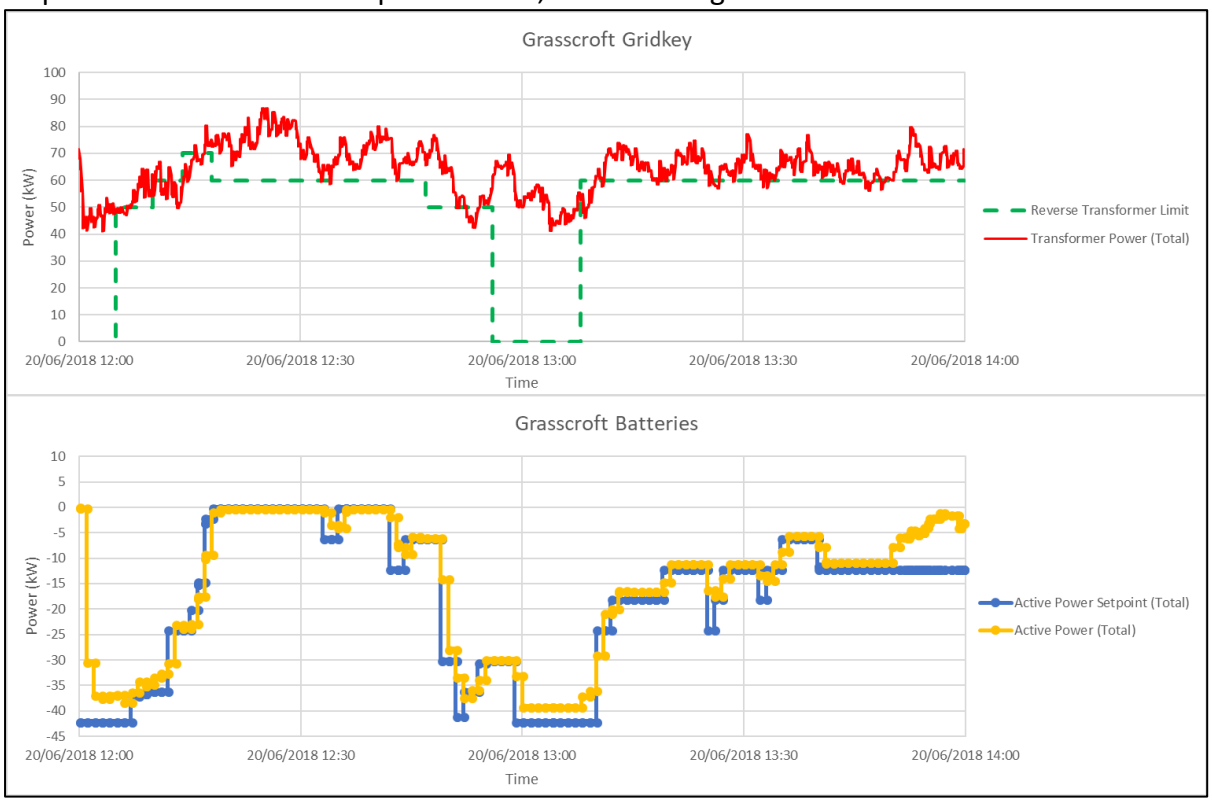


Figure 5-1: Aggregated battery export limitation to limit transformer reserve power flow

6 Intellectual Property Rights

A complete list of all background IPR from all project partners has been compiled. The IP register is reviewed on a quarterly basis. There have been no new IPR entries within this reporting period.

7 Risk Management

Our risk management objectives are to:

- Ensure that risk management is clearly and consistently integrated into the project management activities and evidenced through the project documentation;
- Comply with WPDs risk management processes and any governance requirements as specified by Ofgem; and
- Anticipate and respond to changing project requirements.

These objectives will be achieved by:

- ✓ Defining the roles, responsibilities and reporting lines within the Project Delivery Team for risk management;
- ✓ Including risk management issues when writing reports and considering decisions;
- ✓ Maintaining a risk register;
- ✓ Communicating risks and ensuring suitable training and supervision is provided;
- ✓ Preparing mitigation action plans;
- ✓ Preparing contingency action plans; and
- ✓ Monitoring and updating of risks and the risk controls.

7.1 Current Risks

The LV Connect and Manage risk register is a live document and is updated regularly. There are currently 4 live project related risks, the number of risks have significantly decreased as the customer trials are now finishing, and the current risks relate to the analysis stage Mitigation action plans are identified when raising a risk and the appropriate steps then taken to ensure risks do not become issues wherever possible. In **Error! Reference source not found.** we give details of our top four current risks by category. For each of these risks, a mitigation action plan has been identified and the progress of these are tracked and reported.

Table 7-1: Top four current risks (by rating)

Details of the Risk	Risk Rating	Mitigation Action Plan	Progress
Take up of LCTs is less than expected	Minor	Simulate LCT activity	Risk has been mitigated via simulation of EVs charging.
Data is not protected as required	Minor	Data protection insurance Put in place robust data protection systems Document contractual obligations Adherence to Data Protection Plan	Project data has been protected as required.
Nortech resources unavailable	Minor	Allocate dedicated resource to project	Dedicated resource allocated to project
WPD resources unavailable	Minor	Close working relationship between WPD and Nortech	Handover between WPD Project Managers due to take place in Q4 2018

Error! Reference source not found. provides a snapshot of the risk register, detailed graphically, to provide an on-going understanding of the projects' risks.

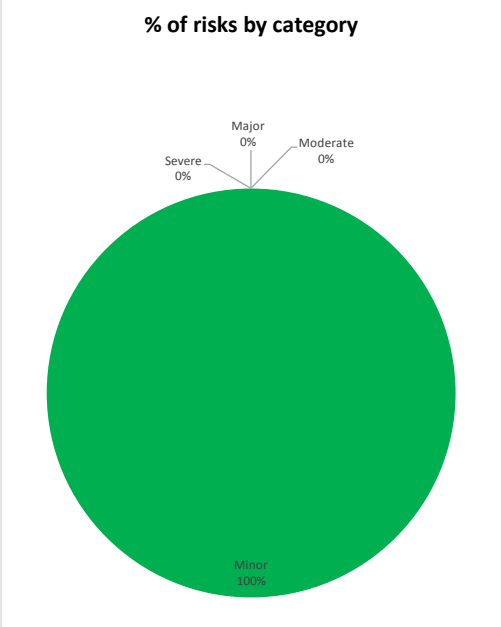
Table 7-2: Graphical view of Risk Register

Likelihood = Probability x Proximity						
	Certain/Imminent (21-25)	0	0	0	0	0
	More likely to occur than not/Likely to be near future (16-20)	0	0	0	0	0
	50/50 chance of occuring/ Mid to short term (11-15)	1	0	0	0	0
	Less likely to occur/Mid to long term (6-10)	1	0	0	0	0
	Very unlikely to occur/Far in the future (1-5)	0	1	1	0	0
		1. Insignificant changes, re-planning may be required	2. Small Delay, small increased cost but absorbable	3. Delay, increased cost in excess of tolerance	4. Substantial Delay, key deliverables not met, significant increase in time/cost	5. Inability to deliver, business case/objective not viable
		Impact				

	Minor	Moderate	Major	Severe	
Legend	4	0	0	0	No of instances
Total	4				No of live risks

Error! Reference source not found. provides an overview of the risks by category, minor, moderate, major and severe. This information is used to understand the complete risk level of the project.

Table 7-3: Percentage of Risk by category



7.2 Update for risks previously identified

Descriptions of the most significant risks, identified in the previous six monthly progress report are provided in

report are provided in

with updates on their current risk status.

Table 7-4: Risks identified in the previous progress report

Details of the Risk	Previous Risk Rating	Current Risk Rating	Mitigation Action Plan	Progress
Delays with EV customer installations	Moderate	Closed	N/A	Risk closed
Delays with battery/inverter procurement	Minor	Closed	N/A	Risk closed
Take up of LCTs is less than expected	Minor	Closed	N/A	Risk closed
Delays with PV customer installations	Minor	Closed	N/A	Risk closed

Data is not protected as required	Minor	Minor	Put in place robust data protection systems Adherence to Data Protection Plan	Project data has been protected as required.

8 Consistency with Project Registration Document

The scale, cost and timeframe of the project has remained consistent with the registration document, a copy of which can be found here:
https://www.westernpower.co.uk/innovation/projects/lv-connect-and-manage

9 Accuracy Assurance Statement

This report has been prepared by the LV Connect and Manage Project Delivery Manager (Samuel Jupe), reviewed by the WPD Project Manager (Ricky Duke) and approved by the Future Networks Manager (Roger Hey).

All efforts have been made to ensure that the information contained within this report is accurate. WPD confirms that this report has been produced, reviewed and approved following our quality assurance process for external documents and reports.

Glossary

Term	Definition
ANM	Active Network Management
BAU	Business as usual
CIRED	International Conference on Electricity Distribution
DG	Distributed Generation
DLC	Domestic Load Controller
DNO	Distribution Network Operator
DNP3	Distributed Network Protocol 3.0
EV	Electric Vehicle
GB	Great Britain
GSM	Global System for Mobile Communications
HV	High Voltage
IPR	Intellectual Property Register
LCT	Low Carbon Technologies
LV	Low Voltage
MP	Member of Parliament
NIA	Network Innovation Allowance
OCPP	Open Charge Point Protocol
QAS	Quotation Accuracy Scheme
SSEN	Scottish and Southern Electricity Networks
WPD	Western Power Distribution