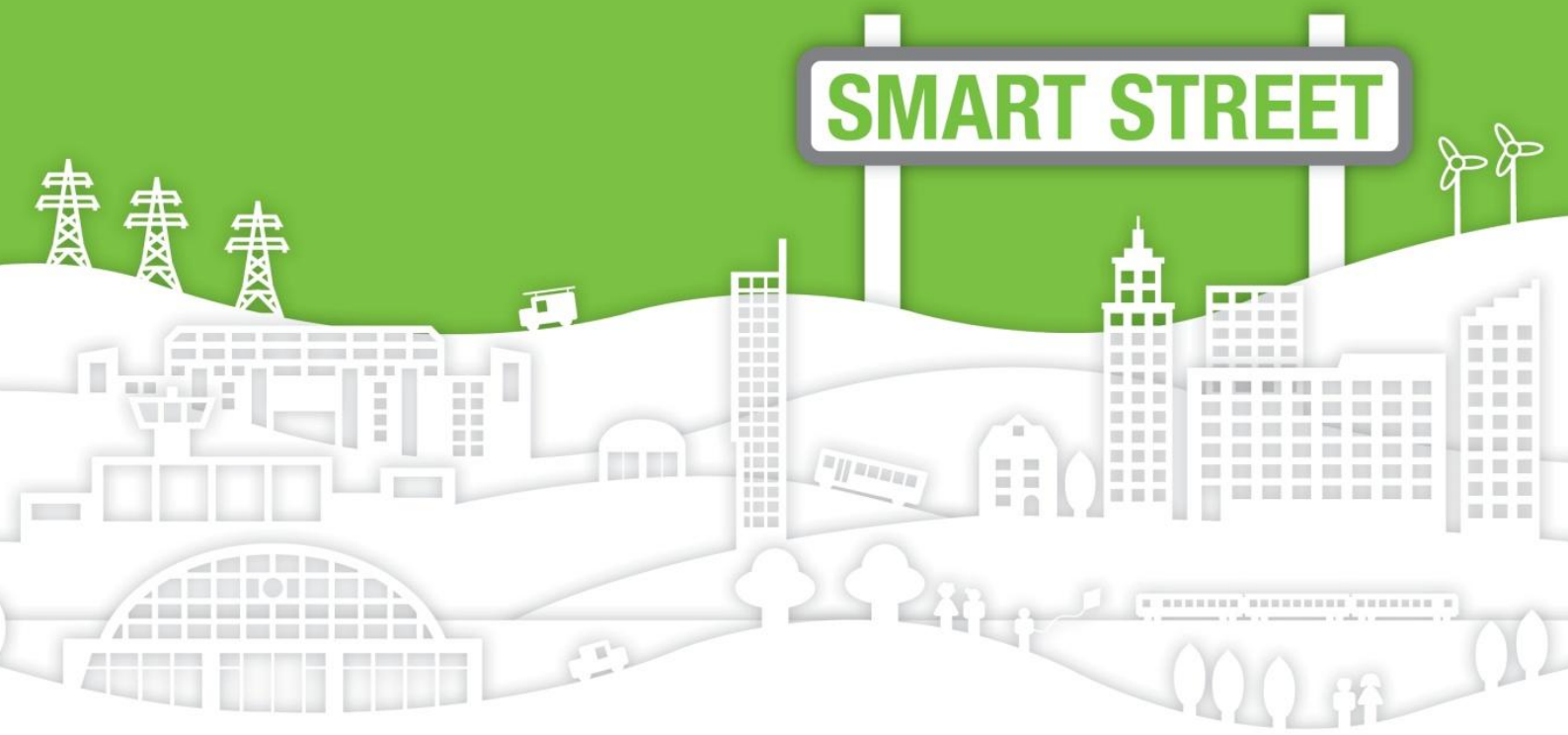
Smart Street

Project Progress Report (PPR)

Version 1.0

19 December 2016



VERSION HISTORY

Version	Date	Author	Status	Comments
V0.1	16/11/2016	B Ingham	First draft	
V0.2	07/12/2016	B Ingham	Draft	Updated from initial review
V1.0	14/12/2016	B Ingham	Final	

REVIEW

Name	Role	Date
Andrew Howard	Innovation programme manager	13/12/2016
Paul Turner	Innovation delivery manager	13/12/2016
Cara Blockley	Innovation bid manager & project assurance	14/12/2016

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Name	Role	Signature & date
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CONTENTS

GLOSSARY OF TERMS

Abbreviation	Term
APN	Access Point Network
C_2C	Capacity to Customers (Electricity North West second tier LCN Fund project)
CEP	Customer engagement plan
CLASS	Customer Load Active System Services (Electricity North West second tier LCN Fund project)
CVR	Conservation voltage reduction
DINIS	Distribution network information system
DNO	Distribution network operator
DPS	Data protection statement
ECP	Engaged customer panel
FAT	Factory acceptance test
GM	Ground mounted
HV	High voltage
ICCP	Inter control communication protocol
IFI	Innovation Funding Incentive
ITT	Invitation to tender
LCT	Low carbon technology
LV	Low voltage
NMS	Network management system
O/H	Overhead
SAT	Site acceptance test
QUB	Queen's University Belfast
SDRC	Successful delivery reward criteria
SDRC output	Discrete evidence of attainment or part attainment of an SDRC as defined in the project direction
SP5	Spectrum Power 5
U/G	Underground
UoM	University of Manchester
U3A	University of the third age
VT	Voltage transformer

1 EXECUTIVE SUMMARY

Funded by Ofgem's Low Carbon Networks Second Tier funding mechanism, the Smart Street project was authorised to commence in December 2013 and is now due to complete in April 2018. The project is being undertaken by Electricity North West and key partners.

Utilising the most advanced technology developed for LV network management, Smart Street challenges current operational practices and demonstrates how to optimise HV and LV networks in real time.

The Smart Street method combines the concepts of interconnection of networks, developed within the C_2C project, and elements of the voltage control technologies developed by Electricity North West under the First Tier of the LCN Fund. The project utilises advanced real time optimisation software to simultaneously manage HV and LV network assets to respond to customers' changing demands in the most efficient end-to-end manner. The three key incremental steps in the Smart Street method are the application of:

- Co-ordinated voltage control, using transformers fitted with on-load tap changers and capacitors, across HV and LV networks
- Interconnecting traditionally radial HV and LV circuits and assuming control of these networks within the Electricity North West control room
- Real time co-ordinated configuration and voltage optimisation of HV and LV networks.

Enhancing existing networks in this way enables accelerated connection of clusters of low carbon technologies (LCTs) that contribute to emission reduction targets. Smart Street is a low risk, transferable, non-intrusive method which is an alternative first intervention to traditional network reinforcement. It is envisaged that the Smart Street method will release capacity up to four times faster and 40% cheaper than traditional reinforcement techniques for LCT clusters. Smart Street's optimisation software is expected to deliver conservation voltage reduction to improve the energy efficiency of customers' electrical appliances, reducing energy up to 3.5% per annum, and lowering network losses by up to 2% per annum across HV and LV networks. This will deliver recurring financial savings for customers, without degradation to the quality of customers' supplies.

During the Smart Street project, communications from customers in the trial areas will be monitored to collect quantitative customer information. The project team will also hold a series of customer focus groups, with individuals recruited from within the trial areas, to collect qualitative customer information. In addition, the team will utilise outputs from the CLASS survey, which was designed to establish the customer experience of a change in supplied voltage. These findings support Smart Street customer research.

Progress to date

The project was granted a four-month extension including a variance to project management costs on 9 March 2016. The project costs to date are £7,265k with completion costs estimated to be £8,647k of the £9,550k budget including contingencies.

This report is the sixth project progress report and covers the period June 2016 to November 2016 inclusive. The key highlights to date are:

Installation plan

The installation programme was completed in January 2016 in line with the four-month project extension. A small number of equipment issues continue to arise on the trial networks which have been resolved within the project budget with no impact to the project timescales. These are detailed in Section 6 of this document.

Spectrum Power 5

The installed system has operated to optimise the network utilising the installed equipment in line with the project trials.

Trials and research

The trials and research workstream has continued (detail in Section 2.3) with the trials, the optimisation software has been run in closed loop mode and has operated to optimise the networks involved in the project. System data has been extracted and passed to the project's academic partners for analysis, copies of which are available on the website.

Customer engagement

- The customer workstream has continued to liaise closely with the customer contact centre (CCC) to ensure customer enquiries associated with any aspect of this project are captured and appropriately managed.
- The customer workstream has continued to work closely with the technology workstream to ensure that technological challenges have been overcome without any detrimental impact to customers.

Leaning and dissemination

In addition to continued dissemination, knowledge sharing with stakeholders, regular updates on the project website and social media, learning and dissemination activities this reporting period include:

- Fifth Smart Street six-monthly progress report published on the Smart Street website
- Active participation and presentation of the project at the LCNI conference in Manchester in October 2016.

During the reporting period the project has delivered two SDRC outputs detailed in Section 5.

Figure 1.1: SDRCs delivered during the reporting period

Milestone	Workstream	Completion date
Project progress reports published on Smart Street website (June 2016 PPR)	Research/ trials	Jun-16
Active participation at four annual LCNI conferences – 2016	Project management	Oct-16

During the next reporting period the project will deliver eight SDRC outputs in line with the approved extension period.

Figure 1.2: SDRC look ahead

Milestone	Workstream	Completion date
Publish interim HV and LV voltage and configuration optimisation study report	Research	Feb-17
Publish interim design and operation of interconnected LV networks study	Research	Feb-17
Publish interim cost benefit assessment study	Research	Feb-17
Publish interim carbon impact assessment report	Research	Feb-17

Milestone	Workstream	Completion date
Publicise Smart Street via internal comms	Dissemination	Feb-17
Publish fourth advertorial	Dissemination	Feb-17
Second Smart Street knowledge sharing event	Dissemination	Feb-17
Publish seventh project progress report	Dissemination	Jun-17

Summary of key risks

Project risks are monitored on a continuous basis, including the potential risks that were documented in the full submission. The status of these is described in Section 4.

Summary of key learning outcomes delivered in the period

A detailed description of the project's learning outcomes can be found in Section 6; the areas where learning has emerged are summarised below:

- A detailed survey of the mobile network signal quality at the site selection phase would ensure that all trial sites have reliable communication during the project.

Figure 1.3: Third party dissemination activities

Event	Contribution	Date
Active participation and presentation on Smart St at the LCNI Conference, Manchester	Presented	Oct-16
Hacking the energy system	Presented	Nov-16
Presented project to the Manchester Electrical Energy and Power Systems (MEEPS) workshop	Presented	Nov-16

2 PROJECT MANAGER'S REPORT

2.1 General project management

The most significant project management activities undertaken during the reporting period are listed below:

- Project monitoring and control
- Continued stakeholder engagement and management
- Dissemination of the Smart Street project at industry events
- Monitoring ongoing trials and responding to any arising issues.

During the reporting period the project emphasis has focused on ensuring the satisfactory operation of the equipment during the ongoing trials. The customer workstream has continued to monitor enquiries relating to the on-going operation of the project systems. Spectrum 5 was successfully SAT tested in December 2015 and has been running in both closed and open loop mode in line the project trials.

During the next reporting period the most significant project management activities will be:

- Managing and dealing with network issues as and when they arise
- Project monitoring and control
- Continued stakeholder engagement and management, including the next engaged customer panel
- Oversee monitoring of the Smart Street network in the six trial areas which includes maintaining good levels of communication with business as usual colleagues
- Monitoring the on-site trials and data recovery for analysis by the universities.

There are no other project management risks or issues associated with delivery of a project SDRC or maintaining consistency with the full submission.

2.2 Technology workstream

The most significant technology workstream activities during the reporting period are listed below:

- Continued monitoring of system performance and equipment
- Scheduled any network changes in response to data analysis eg change off load taps if data collected indicates scope for this.

During the next reporting period, the technology workstream's significant activities will be:

- Continued monitoring of system performance and equipment
- Schedule any network changes in response to data analysis eg change off load taps if data collected indicates scope for this.

All SDRCs associated with the above activities are complete or on track to the plan.

2.3 Trials and research workstream

The most significant trials and research workstream activities during the reporting period are listed below:

- Continuation of the live trials
- Publication of the trial data on the Smart Street website
- Analysis of initial data gathered from the trial areas.

All SDRCs associated with the above activities are complete or on track. During the next reporting period, the trials and research workstream's significant activities will be:

- Continuation of live trials and publication of the generated data on the Smart Street website
- Transference of the trial data to the academic partners to allow analysis of the benefits
- Review of the findings detailed so far by the academic partners to determine areas of particular interest to the project and to refine the optimisation parameters to better deliver the observed benefits
- Modification of the trial parameters based on the findings of the initial academic review of the data
- Collation and review of the academic studies due in January 2017 that form the basis of the SDRCs scheduled for Feb 2017.

There are currently no trials and research risks or issues associated with delivery of a project SDRC or maintaining consistency with the full submission.

2.4 Customer workstream

The most significant customer workstream activities completed during this reporting period are listed below:

- The customer workstream has continued to work closely with the customer contact centre (CCC) to ensure that customer enquiries associated with any aspect of this project are captured and managed. There have been no customer enquiries concerning Smart Street during this reporting period
- The customer workstream continues to work closely with the technology workstream to ensure that technological challenges are overcome, as they arise, thus negating detrimental customer impact. All technical and planning issues that were likely to have had a customer impact have been resolved and consequently there was no customer contact about any aspect of the Smart Street trials during this reporting period
- Work has commenced to develop the engagement materials required for the customer focus groups, which will be conducted mid trial to assess customers' perceptions of the effects of Smart Street.

During the next reporting period the customer and commercial workstream's significant activities are as follows:

- Customer focus groups will be conducted to assess customers' perception about the effects of Smart Street in each of the three broad trial regions.

2.5 Leaning and dissemination workstream

The key activities undertaken by the learning and dissemination workstream during the period are summarised below:

- Active participation and presentation of the project at the LCNI conference in Manchester in October 2016
- Presentation of the project to the 'Hacking into the energy system workshop' on November 2016
- Presentation of the project to the Manchester Electrical Energy and Power Systems (MEEPS) workshop in November 2016.

Additional internal dissemination activities included:

- Ongoing advice and support to operational colleagues working on and around the trial areas.

Regular updates to the Smart Street website: Throughout the reporting period, the project website has been updated regularly with project outputs at: www.enwl.co.uk/smartstreet.

Social media forums exploited: To ensure that the key messages from Smart Street are disseminated as widely as possible, the project team is using a range of social media outlets to communicate Smart Street-related information, specifically:

 http://www.facebook.com/ElectricityNorthWest

 https://twitter.com/ElectricityNW

 http://www.linkedin.com/company/Electricity-North-West

 http://www.youtube.com/ElectricityNorthWest

Internal Electricity North West social media: To improve information sharing within the business, regular use is made of the internal social media application "Yammer".

In the next reporting period, the learning & dissemination workstream will undertake the following activities:

- Publish interim HV and LV voltage and configuration optimisation study report
- Publish interim design and operation of interconnected LV networks study
- Publish the fourth industry newsletter
- Publish interim cost benefit assessment study
- Publish interim carbon impact assessment report
- Publicise Smart Street via internal comms
- Smart Street learning event
- Publish the seventh monthly project progress report.

There are currently no customer risks or issues associated with delivery of a project SDRC or maintaining consistency with the full submission.

3 CONSISTENCY WITH FULL SUBMISSION

At the end of this reporting period, it can be confirmed that the Smart Street project is being undertaken in accordance with the full submission.

4 RISK MANAGEMENT

Definition of risk status

Open: Accepted risk that needs visibility until such time that it is no longer a risk to the project. No further preventative actions identified or implemented.

Controlled: Risk with mitigating actions put in place to alleviate the possibility of an occurrence. Preventative actions identified or implemented to help manage the risk.

Closed: Potential of the risk occurring has passed or changes have been made to the project so that there is no longer a risk.

4.1 Current risks and issues

There are currently no uncontrolled risks that could impede the achievement of any of the SDRCs outlined in the project direction, or which could cause the project to deviate from the full submission.

Risk 3 – Risk that the trial areas selected will not include areas with CLASS or C_2C leading to a lost opportunity to gain further value from utilising existing assets. *Status: Closed*

The selection criteria outlined in Appendix B of the full submission has been applied to the selected circuits with priority applied to CLASS and C_2C assets. The circuit selection criteria were designed to utilise existing trial networks where practicable. Alternate circuits are only included where there are other factors that prevent overlap with CLASS or C_2C. Of the 11 HV circuits selected three overlap with CLASS and eight overlap with C_2C.

Risk 7 – Risk that new technologies or software installed do not perform as expected in the commissioning stage leading to delays to commencing the trial and potentially affecting the quality of Smart Street outputs. *Status: Closed*

Smart Street equipment technologies have been trialled and proven under previous IFI and First Tier LCN Fund projects, or proven in business as usual scenarios. In addition, early commissioning dates allowed for contingency time.

Some issues have arisen during commissioning as Smart Street is the first instance of these technologies being used together as a complete system. These issues have been fully

investigated and an individual plan was put in place to resolve each one to a satisfactory outcome within the new project timescales.

Risk 8 – Risk that customers in the trial areas perceive a change to their electricity supply leading to hypothesis failure and potential adverse publicity for Smart Street. *Status: Open*

As part of proving the hypothesis that no change will be perceived by customers, the project team will carry out ongoing monitoring via the customer contact centre. Following any notification of a perceived change, extra monitoring equipment will be installed to validate the claim and ensure that the perceived change is not due to the customer being sensitised to the trial. In addition, the customer surveys designed for CLASS include control groups that can be used to benchmark any survey responses that are obtained from the trials. To further qualify the customer experience, focus groups will be held in the latter part of the second year of the trial period with customers from each of the Smart Street trial locations.

Risk 11 – Risk that external factors, not directly influenced by the trials or related to Smart Street, could cause customers to become negative towards Electricity North West or LCN Fund projects. *Status: Open*

The Smart Street project team are working closely with the Electricity North West press office to identify any potential issues and formulate targeted communications to proactively minimise any adverse impacts to Smart Street.

Risk 13 – Risk that the University of Manchester or Queen's University, Belfast undergo personnel changes during the project, leading to loss of specific skills which could impact the quality of deliverables. *Status: Controlled*

Work packages agreed with the universities have defined the tasks for which each university is responsible. All research activities are being undertaken in a collaborative manner, with the involvement of multiple individuals across both academic institutions to minimise the risks associated with the movement of research teams. During the project the lead researcher, Dr Nando Ochoa, has moved to a new position at the University of Melbourne. However he has agreed to continue with the oversight of the Smart Street research activities remotely.

Risk 14 – Risk that the high volume of LCN Fund events will dilute the effectiveness of dissemination activities leading to lower than expected value derived from Smart Street being achieved. *Status: Controlled*

Strong project branding has been developed along with key messages and high quality dissemination materials to ensure that Smart Street is clearly differentiated and reaches the right audience. Choice of dissemination media is being optimised to achieve maximum reach and coverage. Throughout the project the learning and dissemination approach will be tailored to meet the needs of each stakeholder group. In addition to the publication of learning materials through social media and online, industry wide and bespoke knowledge sharing events will take place.

Risk 15 – Risk that the varied interests of the stakeholders prevents knowledge from being disseminated effectively leading to the learning outcomes from Smart Street not being maximised. *Status: Controlled*

During the Smart Street mobilisation, multiple communication channels and a range of stakeholders have been identified to maximise Smart Street dissemination outcomes. A Smart Street project partner event has been held to open communication channels between all parties and this will be followed by quarterly steering group meetings. Dissemination of knowledge forms a key part of each project steering group to ensure all internal stakeholders are aware of the outcomes of the project.

Risk 21 – Risk that all HV ground-mounted capacitors not delivered on time. *Status: Closed*

These were delivered in line with the project extension timescales and subsequently installed on site.

Risk 23 – Risk of VT failure associated with O/H capacitors. *Status: Closed*

An operational restriction is now in place on Mid Central Electric VTs due to disruptive failures occurring. This restriction came into force a few days before the installation of the HV O/H capacitors, which are fitted with this type of VT. Initially the restriction only prevented live operation which still allowed installation. Subsequently an outright restriction was imposed, resulting in alternative manufacturers being sourced.

Alternative VTs were identified, approved and installed.

Risk 24 – Risk of signal strength issue with LYNX devices. *Status: Controlled*

Variable signal strength was experienced at some LYNX locations. Kelvatek have supplied a quantity of alternative high gain aerials and aerial pillars for such locations.

Ongoing monitoring of individual signal strength performance will be conducted during the trial period. A small number of Lynx sites are still experiencing difficulties in maintaining consistent signal strength despite having the external aerials fitted. Working with Vodafone it was identified that the only way to further improve signal quality at these sites is to utilise roaming SIMs. However this change would entail modifications to the RTUs and ENWLs APN and so is not feasible within the constraints of the project. The intermittent signal of these few units will not impact on the validity of the trials.

Risk 26 – Risk that all LYNX devices are not installed by trial go live. *Status: Controlled*

After rollout of LYNX devices and during the testing phase, six out of the 42 units installed failed due to water ingress. All units were recovered for investigation and it was established there was a design issue that affected the bell housing of some of the units. This has been resolved by an improved bell housing design and a sealed antenna cable. A routine inspection of link boxes is being conducted during the trial period to confirm that this issue is resolved. All link boxes have now been installed and inspections indicate no recurrence of the water ingress issue. Inspections will continue into the winter period to ensure that the worsening climatic conditions do not lead to any issues, although it is not envisioned that there will be any impact. The project team is, however confident that the modifications have resolved this issue.

Risk 30 – Land access issues for O/H capacitor installations. *Status: Closed*

There was a risk that land access issues would delay installation work.

Due to the severe weather and subsequent land saturation, access to land was prohibited by the land owners. Work was delayed until the land became fit for access. Access has subsequently been granted and the work carried out.

Risk 31 – Concerns raised over the interlocking on the HV GM capacitor banks. *Status: Controlled*

Following the energisation of the capacitor banks during the previous reporting period concerns of the suitability of the interlocking arrangements have been raised by Electricity North West's system operations section. As such the devices have been temporarily taken offline while modifications are made to alleviate these concerns. The first of these has been completed and the remainder are expected to be completed in January 2017.

5 SUCCESSFUL DELIVERY REWARD CRITERIA

During the reporting period, two planned SDRCs were delivered. This is detailed in Figure 5.1 below.

Figure 5.1: SDRC delivered in reporting period

Milestone	Workstream	Completion date
Project progress reports published on Smart Street website	Research/ trials	Jun-16
Active participation at four annual LCNI conferences – 2016	Project management	Oct-16

The SDRC planned for the next reporting period can be seen in Figure 5.2 below.

Figure 5.2: SDRC look ahead

Milestone	Workstream	Completion date
Publish interim HV and LV voltage and configuration optimisation study report	Research	Feb-17
Publish interim design and operation of interconnected LV networks study	Research	Feb-17
Publish interim cost benefit assessment study	Research	Feb-17
Publish interim carbon impact assessment report	Research	Feb-17
Publicise Smart Street via internal comms	Dissemination	Feb-17
Publish fourth advertorial	Dissemination	Feb-17
Second Smart Street knowledge sharing event	Dissemination	Feb-17
Publish seventh project progress report	Dissemination	Jun-17

During the next reporting period none of the SDRCs are forecast to be delivered at variance to the dates contained within the project plan appended to the full submission.

6 LEARNING OUTCOMES

A project website has been established as a repository for sharing project learning to interested stakeholders. The learning outcomes during the period are described below.

Lesson 1: Mobile network signal issues

While the installation of high gain aerials and external pillars has resolved the majority of the issues with the communications there remain some areas where the signal is intermittent. Discussions between the project team, Electricity North West telecoms section and Vodafone have determined that the only option to improve signal quality at these sites is to utilise roaming SIMs. Due to the complexity of adopting these, this is not feasible within the project timescales. It is recommended that these be considered for all future projects where mobile communications are to be used. In addition, a site survey to check the mobile signal strength

should be considered when selecting the trial sites to identify any such issues at the design stage.

7 BUSINESS CASE UPDATE

Electricity North West is not aware of any developments that have taken place since the issue of the project direction that affect the business case for the project.

8 PROGRESS AGAINST BUDGET

The original project budget as defined in the project direction is shown in Appendix A.

Project expenditure compared to baseline forecast is summarised below at the cost category level and in Appendix B at project activity level. The report includes expenditure up to and including 30 Nov 2016.

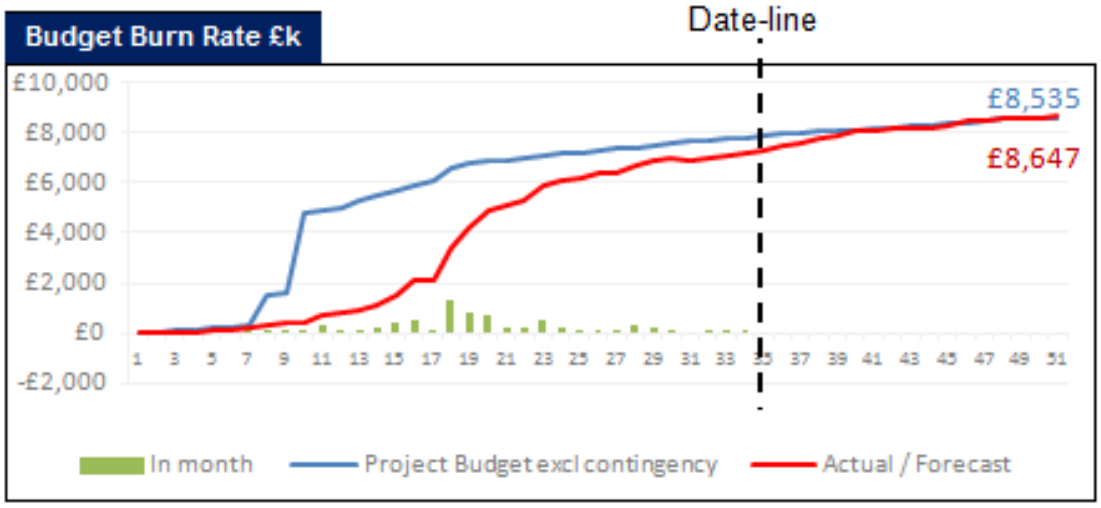
Figure 8.1: Project expenditure

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to date			Total Project			
	Actual	Plan	Variance	Forecast	Plan	Variance	%
Labour	1,574	1,559	-16	1,975	1,888	-88	-5%
Equipment	3,159	3,180	21	3,271	3,235	-36	-1%
Contractors	1,360	1,859	499	1,940	1,960	20	1%
IT	1,026	1,090	64	1,099	1,090	-9	-1%
Contingency	0	1,013	1,012	0	1,015	1,015	100%
Decommissioning	0	0	0	39	39	0	0%
Other	145	219	74	323	323	0	0%
Total	**7,265**	**8,919**	**1,655**	**8,647**	**9,550**	**903**	**9%**

Source: Ofgem Schedule to Project Direct - December 2013

The actual spend to date is £7,265k with the forecast at completion cost now £8,647k.

During a regular financial review it was found that data retrieval and storage was mis-allocated and this has now been correctly allocated to the Equipment budget. This has resulted in a reduction in both the contractors and IT cost lines. During this review costs were also reallocated from the Research – Technical contractors to the Research – CBA & CIA contractors lines to resolve a misallocation.



The estimated at completion forecast is currently expected to remain within the original budget of £9,550k including contingency. The project bank statement is shown in Appendix C. The statement contains all receipts and payments associated with the project up to the end of Nov 2016 including the Nov 2016 month end cost transfer.

9 INTELLECTUAL PROPERTY RIGHTS (IPR)

Electricity North West is following the default IPR arrangements. The company's IPR approach has been considered in line with current period project deliverables and it has been concluded that the default IPR arrangements apply.

10 OTHER

There is no other information at this time that would be relevant to Ofgem in understanding the progress of the project and performance against the SDRCs.

11 ACCURACY ASSURANCE STATEMENT

The project team and select members of the Smart Street project steering group, including the lead member of the bid development team, have reviewed this report to ensure its accuracy.

The financial information has been produced by the Smart Street project manager and the project's finance representative who review all financial postings to the project each month. This ensures that postings have been correctly allocated to the appropriate project activity. The financial information has also been peer-reviewed by the Electricity North West distribution finance business partner. Issue of the document has been approved by the innovation delivery manager.

APPENDIX A – PROJECT DIRECTION PROJECT BUDGET

£000's
Excluding Partner Funding
Ofgem Cost Category

Labour	**1,888**
HV & LV Network Management & Interconnection - Labour	305
Network Configuration & Voltage Optimisation - Labour	431
Project Management, Planning, Policy and Training - Labour	1,152
Equipment	**3,235**
Data Preparation - Equipment	285
HV & LV Network Management & Interconnection - Equipment	2,229
HV & LV Voltage Control - Equipment	721
Contractors	**1,960**
Customer Engagement & Survey - Contractors	110
HV & LV Voltage Control - Contractors	350
LV Network Management & Interconnection - Contractors	161
Network Configuration & Voltage Optimisation - Contractors	381
Peer reviews, support & customer research - Contractors	142
Research -Technical - Contractors	626
Research - CBA & CIA - Contractors	189
IT	**1,090**
Network Configuration & Voltage Optimisation - IT	1,090
Contingency	**1,015**
HV & LV Network Management & Interconnection - Contingency	272
HV Voltage Control - Contingency	426
Dissemination, Policy,Training & Trials - Contingency	82
Network Configuration & Voltage Optimisation - Contingency	235
Decommissioning	**39**
Decommissioning	39
Other	**323**
Technology build and Trials data - Other	87
Learning & Dissemination - Other	133
Accommodation - Other	103
Total	**9,550**

Source: Ofgem Schedule to Project Direct - December 2013

APPENDIX B – DETAILED PROJECTED PROJECT EXPENDITURE

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to date			Total Project			
	Actual	Plan	Variance	Forecast	Plan	Variance	Variance %
Labour	**1,574**	**1,559**	**(16)**	**1,975**	**1,888**	**(88)**	**-5%**
HV & LV Network Management & Interconnection - Labour	319	305	(14)	319	305	(14)	-5%
Network Configuration & Voltage Optimisation - Labour	414	400	(14)	440	431	(9)	-2%
Project Management, Planning, Policy and Training - Labour	841	853	13	1,216	1,152	(64)	-6%
Equipment	**3,159**	**3,180**	**21**	**3,271**	**3,235**	**(36)**	**-1%**
Data Preparation - Equipment	154	230	76	203	285	81	29%
HV & LV Network Management & Interconnection - Equipment	2,195	2,229	34	2,259	2,229	(29)	-1%
HV & LV Voltage Control - Equipment	810	721	(90)	809	721	(88)	-12%
Contractors	**1,360**	**1,859**	**499**	**1,940**	**1,960**	**20**	**1%**
Customer Engagement & Survey - Contractors	64	66	2	111	110	(0)	0%
HV & LV Voltage Control - Contractors	365	350	(14)	367	350	(17)	-5%
LV Network Management & Interconnection - Contractors	162	161	(2)	162	161	(2)	-1%
Network Configuration & Voltage Optimisation - Contractors	356	381	25	356	381	25	7%
Peer reviews, support & customer research - Contractors	32	103	71	132	142	10	7%
Research -Technical - Contractors	334	608	274	667	626	(41)	-7%
Research - CBA & CIA - Contractors	47	189	143	145	189	45	24%
IT	**1,026**	**1,090**	**64**	**1,099**	**1,090**	(9)	**-1%**
Network Configuration & Voltage Optimisation - IT	1,026	1,090	64	1,099	1,090	(9)	-1%
Contingency	**0**	**1,013**	**1,012**	**0**	**1,015**	1,015	**100%**
HV & LV Network Management & Interconnection - Contingency	0	272	272	0	272	272	100%
HV Voltage Control - Contingency	0	426	426	0	426	426	100%
Dissemination, Policy,Training & Trials - Contingency	0	80	80	0	82	82	100%
Network Configuration & Voltage Optimisation - Contingency	0	235	235	0	235	235	100%
Decommissioning	**0**	**0**	**0**	**39**	**39**	**0**	**0%**
Decommissioning	0	0	0	39	39	0	0%
Other	**145**	**219**	**74**	**323**	**323**	**0**	**0%**
Technology build and Trials data - Other	10	64	54	87	87	1	1%
Learning & Dissemination - Other	70	81	12	133	133	(0)	0%
Accommodation - Other	66	74	8	103	103	(0)	0%
Total	**7,265**	**8,919**	**1,655**	**8,647**	**9,550**	**903**	**9%**

APPENDIX C – PROJECT BANK ACCOUNT

The bank statement below details all transactions relevant to the project up to 30 November 2016. This includes all receipts and payments associated with the project up to the end of Nov 2016 including the Nov 2016 month end cost transfer.

Lloyds Bank — **Statements and Balances** — **Yesterday's Statement** — **N397926**

300002-01676933
ELECTRICITY NWL NO.13 LCNF (SMART) (GBP)

Date	Type	Narrative	Value Date	Payments	Receipts	Balance
01JUN16		Opening Ledger Balance				3,922,895.61 Cr
09JUN16	CR	INTEREST (GROSS)			1,665.89	3,924,561.50 Cr
11JUL16	CR	INTEREST (GROSS)			1,720.36	3,926,281.86 Cr
09AUG16	CR	INTEREST (GROSS)			1,398.40	3,927,680.26 Cr
06SEP16	DR	TO A/C TFR 02749020 300002		54,902.90		3,872,777.36 Cr
06SEP16	DR	TO A/C TFR 02749020 300002		75,034.44		3,797,742.92 Cr
06SEP16	DR	TO A/C TFR 02749020 300002		73,123.91		3,724,619.01 Cr
06SEP16	DR	TO A/C TFR 02749020 300002		120,123.30		3,604,495.71 Cr
06SEP16	DR	TO A/C TFR 02749020 300002		3,745.56		3,600,750.15 Cr
06SEP16	DR	TO A/C TFR 02749020 300002		310,555.62		3,290,194.53 Cr
09SEP16	CR	INTEREST (GROSS)			816.49	3,291,011.02 Cr
10OCT16	CR	INTEREST (GROSS)			698.78	3,291,709.80 Cr
31OCT16	DR	TO A/C TFR 02749020 300002		88,766.83		3,202,942.97 Cr
31OCT16	DR	TO A/C TFR 02749020 300002		43,264.71		3,159,678.26 Cr
01NOV16	CR	FROM A/C TFR 02749020 300002			43,264.71	3,202,942.97 Cr
09NOV16	CR	INTEREST (GROSS)			670.00	3,203,612.97 Cr
30NOV16	CR	FROM A/C TFR 02749020 300002			3,745.56	3,207,358.53 Cr
30NOV16	DR	TO A/C TFR 02749020 300002		74,928.30		3,132,430.23 Cr
30NOV16	DR	TO A/C TFR 02749020 300002		84,479.34		3,047,950.89 Cr
30NOV16	DR	TO A/C TFR 02749020 300002		37,455.56		3,010,495.33 Cr
08DEC16	DR	TO A/C TFR 02749020 300002		108,045.99		2,902,449.34 Cr
08DEC16		Value of Credits (8)			53,980.19	
08DEC16		Value of Debits (12)		1,074,426.46		
08DEC16		Closing Ledger Balance				2,902,449.34 Cr
08DEC16		Closing Cleared Balance				2,902,449.34 Cr

*** End of Report ***

Note: Statement shows two payments (cost transfers) that were incorrect, and have been corrected by two receipts of an equal value.

APPENDIX D – RISK LOG

Risk ID	Risk Title	Risk Description	Status
1	Resource mobilisation risk	There is a risk that ENWL and/or Partners are not able to mobilise their resources in time because of other commitments. This may lead to a delay in achieving key milestones and deliverables. (Other)	Closed
2	Extended consultation requirements risk	There is a risk that following preliminary design, planning issues where equipment is proposed to be located could lead to extended consultation requirements. This could compromise optimal equipment positioning and cause delays to the start of the Trial. (Installation)	Closed
3	Not feasible to use existing CLASS and C2C assets risk	There is a risk that the Trial areas selected will not include areas with CLASS or C2C leading to a lost opportunity to gain further value from utilising existing assets. (Other)	Closed
4	Suitable equipment vendors risk	There is a risk that a lack of suitable equipment vendors may result in a poor response to Invitations for Tenders, leading to reduced competitiveness of quotes and reduced value for money. (Procurement)	Closed
5	Delivery lead times risk	There is a risk that actual product delivery lead times may be greater than planned due to supply constraints around some of required technologies eg On Load Tap Changing Transformers, Capacitors, Link Box Switches and RTUs which could lead to installation delay and start of the Trial. (Procurement)	Closed
6	Optimisation software delivery	There is a risk that the vendor does not achieve delivery and installation of the Optimisation software or that there are potential constraints with ENWL NMS configuration and commissioning. This could lead to a delayed start of the eta Trials. (Installation)	Closed
7	Technologies or software performance risk	There is a risk that new technologies or software installed do not perform as expected in commissioning stage leading to delays to commencing the Trial and potentially impacting the quality of eta outputs. (Installation)	Closed
8	Customer perceive change to electricity supply	There is a risk that customers in the Trial areas perceive a change to their electricity supply leading to hypothesis failure and potential adverse publicity for eta. (Other)	Open
9	Survey group representation	There is a risk that the survey group does not form a representative sample of either the ENWL or GB customer base. (Other)	Closed
10	Out of limit voltages	There is a risk that some industrial customers have transformer winding ratios of 11000/415 leading to out of limit voltages on their networks. (Other)	Closed

Risk ID	Risk Title	Risk Description	Status
11	External factors risk	There is a risk that external factors, not directly influenced by the Trials or related to eta, could cause customers to become negative towards ENWL or LCN Fund projects. (Other)	Open
12	Customer confusion due to other initiatives	There is a risk that there may be some confusion among customers due to other ongoing government initiatives, eg The Green Deal and Smart Metering roll out program. This could lead to customer engagement being adversely affected. (Recruitment)	Closed
13	Risk of university personnel changes	There is a risk that the University of Manchester or Queen's University, Belfast undergo personnel changes during the Project, leading to loss of specific skills which could impact the quality of deliverables. The lead researcher, Dr Nando Ochoa, has now moved to a new post at the University of Melbourne, however he continues to oversee the project (Other)	Control
14	Dilution due to high volume of LCNF events risk	There is a risk that the high volume of LCN Fund events will dilute the effectiveness of dissemination activities leading to lower than expected value derived from eta being achieved. (Other)	Control
15	Effective knowledge dissemination	There is a risk that the varied interests of stakeholders prevents knowledge from being disseminated effectively leading to the learning outcomes from Smart Street not being maximised (Other)	Control
		Risks identified during project delivery	
16	Weezap/lynx delivery dates	The PM has concerns regarding delivery of the first batch of weezap/lynx devices. During a recent factory visit it was apparent that Kelvatek's manufacturing capability was less well developed than anticipated. Despite this Kelvatek has assured the PM that 10 production units wil be delivered by the end of July.	Closed
17	Signing of contract for supply of capacitors	There is a concern that the contract for the supply of capacitors is not signed by the end of July due to contractual issues with the bids	Closed
18	HV ground mounted capacitor sites	Due to the HV ground mounted capacitors being larger than anticipated in the bid document some may need sited outside of existing substations. Also capacitors require lv supplies.	Closed
19	Signal strength issues with EPM's and LV Capacitors	Devices not communicating with the server due to poor signal strength	Closed
20	Hv ground mounted capacitor modifications	Due to changes to policy/codes of practice within ENWL since the project started modifications are required to the capacitor design.	Closed

Risk ID	Risk Title	Risk Description	Status
21	Hv ground mounted capacitor delivery	Supplier has not met agreed delivery timescales. This is in part due to the supplier failing to source components within anticipated timescales.	Closed
22	LV capacitor software	Delays in supply of latest version of firmware for LV capacitors from ABB.	Closed
23	VT failure for O/H capacitors	Operational restriction now in place on Mid Central Electric VT's, company wide due to disruptive failures. This restriction came into force days before the installation of the HV O/H capacitors which are fitted with this type of VT.	Closed
24	Signal strength issues with Lynx devices at some locations.	No, weak or varied signal strength is being experienced at some link box locations.	Control
25	RTU component failure	A component failure within the second and final batch of system RTU's has been identified by the supplier CG.	Closed
26	Bell House failure	Risk that all LYNX devices are not installed by trial go live. Water has filled the link box bell house at a number of sites	Control
27	Lynx signal	Poor or no signal at some of the Lynx sites	Closed
28	Weezap firmware update	All Weezap devices require updating at factory and swapped over on site	Closed
29	HV Capacitor firmware	Ongoing problems with HV capacitor firmware	Closed
30	Land access issues for o/h capacitor installations	Due to extremely wet weather land owners are preventing land access for the work to erect the HV o/h capacitors.	Closed
31	HV GM Capacitor interlocking	Concerns were raised by ENW System operations regarding the interlocking on the HV GM capacitors	Control