



CLASS Project Progress Report



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VERSION HISTORY

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APPROVAL

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GLOSSARY OF TERMS

Abbreviation	Term
ASC	Autonomous Substation Controller
CLASS	Customer Load Active System Services
DNO	Distribution Network Operator
ICCP	Inter-Control Centre Communications Protocol
NETSO	National Electricity Transmission System Operator
SDRC	Successful Delivery Reward Criteria
SDRC output	Discrete evidence of attainment or part attainment of an SDRC as defined in the Project Direction
RTU	Remote Terminal Unit

1 EXECUTIVE SUMMARY

1.1 The CLASS Project

This is the fifth six-monthly Project progress report (PPR) for the Customer Load Active System Services (CLASS) Project. It covers the period December 2014 to end of May 2015.

Funded via Ofgem's Second Tier Low Carbon Network funding mechanism, CLASS is being undertaken by Electricity North West in partnership with key technology and academic Partners. Formal notification of selection for funding was received from Ofgem on 21 December 2012. The Project is due for completion by 30 September 2015.

CLASS is seeking to demonstrate that the natural relationship between demand and voltage can be exploited to cost-effectively accommodate increasing energy demand, including low carbon technologies (LCTs), on electricity networks. As this approach could maximise the use of existing assets and minimise the need for capital investment, CLASS has the potential to realise significant cost savings to customers.

There are three key elements to CLASS:

Demand reduction at time of system peak: The potential increase in electricity demand by 40% to 60% by 2050 will put strains on existing network capacity. The relationship between voltage and demand can be exploited to alleviate this strain.

CLASS will investigate the application of voltage reduction to reduce demand at a primary substation at times of system peak. The potential that this provides for deferral of network reinforcement, and any impacts on customers, will be assessed.

Frequency reserve and response: The increasing proportion of intermittent renewable energy sources in the UK generation mix will increase the need for system balancing. The costs of conventional balancing services, eg spinning reserves, are significant. A fast-acting demand management facility to aid system balancing would therefore be beneficial.

CLASS will investigate the benefits of switching out a transformer at a primary substation to rapidly reduce demand when system frequency falls below a threshold. The aim is to demonstrate that a very fast demand response (ie <0.5 seconds) can be provided to meet National Electricity Transmission System Operator (NETSO) criteria.

Voltage control: A key challenge for network operators is managing the unacceptably high voltages that can occur on distribution and transmission networks during periods when high renewable generation output coincides with low demand.

CLASS will investigate the benefits that operating primary transformers in a staggered tap configuration provides by absorbing reactive power on the network.

1.2 Progress to date

The key Project highlights during the reporting period are outlined below.

The CLASS Trials progressed to plan

The Class Trials progressed to plan, and were completed at the end of May 2015.

The CLASS technologies functioned as expected

Notably, the CLASS technologies, both on site and in the control rooms, performed as expected. In particular, the on-site technologies responded to the commands from the control room, and where required undertook certain specified actions autonomously. These actions generated a range of data that will ultimately illuminate the effectiveness of CLASS. The data

has been passed to the Project's academic partners, The University of Manchester, who are undertaking analyses to assess the extent to which the various CLASS hypotheses are being achieved.

Analyses of the survey responses showed that CLASS has had no adverse impacts to date on the customers surveyed

To understand what, if any, effects CLASS has on customers, a series of customer surveys were undertaken alongside the CLASS Trials. These surveys set out to assess whether customers in the Trial areas observed or experienced any negative impacts on their electricity supply when the CLASS functions were activated.

Analysis of the customer survey responses shows that there have been no changes in customer perception of their electricity supply, i.e. customers are not observing any discernible effects of CLASS.

All Successful Delivery Reward Criteria (SDRCs) due in the reporting period have been achieved, and those due in the next period are on track.

The thirteen SDRCs due in the reporting period were successfully delivered. The most significant of these are shown in Table 1.1 below, and all are discussed in section 5.

Notably, the requisite evidence for all SDRCs is available for viewing on the CLASS Project website.

Table 1-1: Most significant SDRCs delivered in this reporting period

SDRC (evidence)	Planned date	Completion date
Fourth six monthly Project Progress Report	December 2014	December 2014
Publish on CLASS website Interim Network Modelling and Analysis Reports by January 2015	January 2015	January 2015
Publish on CLASS website Interim Asset Health Study Report by January 2015	January 2015	January 2015
Publish on CLASS website Interim Profile Modelling Study by January 2015	January 2015	January 2015
Publish on CLASS website Interim Asset Health Study Report by January 2015	January 2015	January 2015
Conduct third (Winter) customer survey by February 2015	February 2015	February 2015
Distribute fifth customer communication by February 2015	February 2015	February 2015
Conduct fourth (Spring) customer survey by May 2015	May 2015	May 2015
Distribute sixth customer communication by May 2015	May 2015	May 2015

The Project actual costs to date are £6,522,000, and the estimated at completion costs is now £7,157,000, which is £941,000 favourable to Project Budget (including contingency).

1.3 Risks

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.

Risks are monitored on a continuous basis, including the potential risks that were documented in the Full Submission. The status of these is described at Appendix A.

1.4 Learning and dissemination

A detailed description of the Project's learning outcomes can be found in section 6, the key areas where learning has emerged are summarised below:

Some I&C customers have equipment sensitive to any variation in voltage, even where voltage levels remain well within statutory voltage limits and voltage deltas are at normal business-as-usual levels. This is in the main due to incorrect settings on their equipment and is a business as usual issue and not specific to the Trials.

Observations from the Trials suggest that significant reactive power absorption will require large tap staggers between primary transformers.

Legacy primary transformer tap changer status signals are on occasion, dependent to some extent on type and age, not sufficiently reliable for MicroTAPP relays and require an element of wiring work and remedial action.

Where tap change fail alarm facilities are installed, the alarm management philosophy was reviewed and existing procedures and policies remained largely unchanged however it was suggested that alarms to the control room would be self reset in future.

Customers surveyed have not noticed any changes to their electricity supply, or any adverse effects on their electrical appliances, since the Trials commenced.

There have been no adverse effects on levels of customer satisfaction with Electricity North West's service during the Trials period.

The CLASS Project team has been utilising a range of tools to disseminate and share knowledge about the Project with stakeholders. These include webinars, one of which was held in March 2015, as well as providing regular updates on the Project website and via social media.

The team also attends relevant industry events to present Project developments; In particular, members of the CLASS team attended and participated in the industry events shown in Table 1.2 below.

Table 1.2: Participation in knowledge sharing events during the reporting period

Event	Contribution	Date
CLASS customer newsletter	Authored	February 2015
CLASS webinar	Hosts	March 2015
SQSS Workshop	Hosts	April 2015

2 PROJECT MANAGER'S REPORT

2.1 General

The key Project management activities undertaken during the reporting period are summarised below:

Management of Project resources: CLASS has diverse teams working on the range of Project activities. During the reporting period, these resources continued to be managed and coordinated in order to deliver the agreed SDRC schedule.

Project monitoring and control: Monitoring of Project finances and outcomes has been ongoing to ensure that the Project progresses in a controlled manner and that the outputs are of the highest quality.

Regular engagement with Project Partners: The Electricity North West CLASS Project team engages and holds regular meetings with the Project Partners. These include weekly and monthly meetings with individual partners, *ad hoc* meetings as necessary and quarterly Project steering group meetings that are attended by all Partners.

Change of Project team members: Following a change of Project Manager in November 2014 the Trial and Research Engineer changed in April 2015. These changes are not anticipated to affect the Project and are part of a planned redeployment of employees as the innovation programme workload changes.

Change of contract name: During the period the supplier of the Power on Fusion equipment requested a contract name change as part of a wider GE organisational change. This change will have no impact on the project

Project Closedown: Planning for project closedown activities has commenced, maintaining management of the project resources will be key in the final reporting period.

2.2 Technology, Trials and Research Workstreams

The key activities undertaken by the Technology, Trials and Research Workstreams during the reporting period are summarised below:

Progressed the CLASS Trials: The CLASS Trials came to an end on the 31st May, with completion of the winter and spring Trials which were conducted in line with the CLASS Trial schedule, with additional tests carried out to support academic research,. The trial schedule is available for review at: <http://www.enwl.co.uk/docs/default-source/class-documents/design-approach-to-class-trials-and-associated-test-schedules.pdf?sfvrsn=4>.

Maintenance of CLASS technologies: Occasionally, some of the CLASS technologies have raised alarms, which is effectively an indication in the control room that an on-site check is necessary. The resultant on-site checks are helping to inform future maintenance regimes, and highlight an enhanced reporting capability on the historic equipment on site.

Data is being collected and made available to the University of Manchester: Since the CLASS Trials commenced, a range of network data has been collected that will enable the University of Manchester to undertake analyses to assess whether CLASS is achieving the expected demand response and reactive power absorption associated with the different CLASS functions. The University of Manchester has been provided with access to the CLASS data storage platform (iHost), which means that it can access the data directly, rather than relying on Electricity North West to access and pass on the data to it.

Analysis of data: Having been provided with access to CLASS network data, the University of Manchester has continued to analyse the data which has enabled the production of its interim reports. These were published on the CLASS website January 2015. Following

completion of the trials the University is collating the knowledge learnt and commencing drafting of the final reports

In the next reporting period, the Technology, Trials and Research Workstreams will undertake the following activities:

Continue to provide support and ongoing maintenance to ensure that the CLASS technologies perform as required

Support the CLASS learning and dissemination activities

Publish on the CLASS Website NETS SQSS change proposal

Publish on CLASS website the final network modelling and analysis report

Publish on CLASS website the final profile modelling study

Publish on CLASS website the final asset health study report

Provide confirmation from National Grid that the long term monitoring study has been initiated

2.3 Customer Engagement Workstream

The key activities undertaken by the Customer Engagement Workstream during the reporting period are summarised below:

Completed customer surveys: In the previous Project progress report, it was reported that the autumn Trials and the associated customer surveys had commenced. These have been completed in this reporting period along with the winter and spring surveys.

Updated customers in the Trial areas of Project progress: The Project team recognise the importance of keeping customers informed of the ongoing CLASS trials and the overall progress of the Project. Accordingly, electronic Project updates are issued regularly to customers in the Trial areas. In this reporting period, two such updates were issued. These took the form of electronic newsletters and were sent in February 2015 and May 2015 respectively.

Undertook analyses of the survey data: With all of the customer surveys having been completed, detailed analysis based on the survey responses has been carried out. This analysis shows that when compared to the baseline survey undertaken prior to the Trials, customers have not observed any adverse impact on their electricity supply since the CLASS Trials started. More detail on this learning outcome is provided in section 8 of this report.

In the next reporting period, the Customer Engagement Workstream will undertake the following activities:

Complete the analysis of the customer survey responses to assess trends and outcomes and produce initial summary report.

Support and work closely with the Trials workstream to ensure that the customer impact of the Trials have been captured

Support CLASS learning and dissemination activities to share outcomes from the customer surveys to date

Publish on CLASS website the final customer survey report

2.4 Learning and Dissemination Workstream

The key activities undertaken by the Learning and Dissemination Workstream during the period are summarised below:

Hosted a knowledge sharing webinar: On 26 March, the CLASS Project team hosted a knowledge sharing webinar, to which a wide range of stakeholders were invited. In the webinar, Project Partners NGC provided an overview of the ICCP link. The webinar was well attended and the feedback was overwhelmingly positive.

Hosted a knowledge sharing event: on 10th April 2015, members of the CLASS team hosted an event to share project progress and focus on the impact of CLASS on national standards and policies with particular emphasis on how the learning from the trials will contribute to updating of the Planning Standard, NETS SQSS.

Circulated a newsletter to stakeholders: During this reporting period a range of approaches was used to communicate with customers. In particular:

- A Project update/electronic newsletter circulated to customers in the Trial areas in February 2015
- A Project update/electronic newsletter circulated to customers in the Trial areas in May 2015

Regular updates to the CLASS website: Throughout the reporting period, the Project website has been updated regularly with Project outputs at: www.enwl.co.uk/class.

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

To maximise the effectiveness of dissemination and engagement activities, CLASS is utilising several social media channels; 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:

Submit the fifth six monthly Project progress report to Ofgem

Host a Learning Event in the form of a CLASS in Action workshop

Further update the monitoring data available on the CLASS website

3 CONSISTENCY WITH FULL SUBMISSION

At the end of this reporting period, it can be confirmed that the CLASS Project is being undertaken in accordance with the Full Submission.

4 RISK MANAGEMENT

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.

Risks are monitored on a continuous basis, including the potential risks that were documented in the Full Submission. Apart from the above, none of these risks have materialised or are deemed likely to. In any case, the status of these risks is described at Appendix A.

5 SUCCESSFUL DELIVERY REWARD CRITERIA (SDRC)

Thirteen SDRCs were delivered in this reporting period. These are shown in Table 5.1 below.

Table 5.1: CLASS Project SDRCs delivered in the reporting period

SDRC (Evidence)	Planned date	Status
Publish on CLASS website video podcast 3 by 8 December 2014	December 2014	Delivered
Monitoring data updated on CLASS website by December 2014	December 2014	Delivered
Fourth six monthly Project Progress Report	December 2014	Delivered
Publish on CLASS website Interim Network Modelling and Analysis Reports by January 2015	January 2015	Delivered
Publish on CLASS website Interim Asset Health Study Report by January 2015	January 2015	Delivered
Publish on CLASS website Interim Profile Modelling Study by January 2015	January 2015	Delivered
Publish on CLASS website Interim Asset Health Study Report by January 2015	January 2015	Delivered
Conduct third (Winter) customer survey by February 2015	February 2015	Delivered
Distribute fifth customer communication by February 2015	February 2015	Delivered
Webinar 3 - 23 March 2015	March 2015	Delivered
Monitoring data is updated on CLASS website by April 2015	April 2015	Delivered
Conduct fourth (Spring) customer survey by May 2015	May 2015	Delivered

SDRC (Evidence)	Planned date	Status
Distribute sixth customer communication by May 2015	May 2015	Delivered

The SDRCs due in the next reporting period are shown below.

Table 5-2: CLASS SDRCs due in the next reporting period

SDRC (Evidence)	Planned date	Status
Complete the customer surveys and publish an initial interim report	June 2015	Ongoing
Publish on the CLASS website NETS SQSS Change	June 2015	Ongoing
Publish the fifth six monthly Project Progress Report	June 2015	Ongoing
Hold a learning and dissemination event	July 2015	Ongoing
Publish on CLASS website the final network modelling and analysis report	September 2015	Ongoing
Publish on CLASS website the final profile modelling study	September 2015	Ongoing
Publish on CLASS website the final asset health study report	September 2015	Ongoing
Publish on CLASS website the final customer survey report	September 2015	Ongoing
Provide confirmation from National Grid that the long term monitoring study has been initiated	September 2015	Ongoing

The current status of the evidence for all CLASS SDRCs is shown in Appendix B.

6 LEARNING OUTCOMES

A number of lessons were learnt and learning outcomes achieved during the reporting period. The key learning outcomes are summarised below:

Certain I&C customers may have equipment that is extremely sensitive to voltage variations, by design or by configuration, even when voltage levels are well within statutory voltage limits and voltage deltas are at normal business-as-usual levels. No adverse feedback has been obtained during the formal CLASS customer surveys undertaken after relevant CLASS Trials. To ensure that all potential impacts of CLASS are captured however, the CLASS team interrogated faults reported and customer contacts received via Electricity North West's traditional reporting mechanisms. Any calls or reports that could potentially be linked to the CLASS Trials were then subject to further interrogation.

Observations from the Trials suggest that the autonomous substation controller (ASC) will not provide a sufficient amount of reactive power absorption. To achieve reactive power

absorption under CLASS, the on-site ASC uses an existing MicroTAPP function to produce a tap stagger between primary transformers. This works by the MicroTAPP adjusting the primary transformer tap positions to achieve a circulating current target. This is limited to a level of 10% of the site current, resulting in a maximum tap stagger of three or four taps. This particular design of installation may still allow significant MVar absorption but may affect the effectiveness of this function at the extremes

To determine whether this is the case, further tests have been undertaken, including manual tests, to assess reactive power absorption levels at a higher tap stagger. The University of Manchester is also conducting analysis which will illuminate the levels of reactive power absorption that are achievable using the CLASS approach. Further understanding of this issue will be reported in future progress reports.

Legacy primary transformer tap changer status signals may not be sufficiently reliable for MicroTAPP relays: Following commissioning of the CLASS sites, some of the legacy (50/60 year old) primary sites equipped with MicroTAPP were observed to be sending tap change fail alarms to the Electricity North West control room. Subsequent investigations revealed that at some sites the tap change in progress (TCIP) signal was intermittently disappearing during a tap change. It was also apparent that on some occasions, tap position indication (TPI) was changing when no tapping had been requested, and none had actually occurred (illegal tap change). Another failure mode was caused by the TPI indicating a different tap position to the one expected after being required to perform a tap (tap runaway) when in reality the tap changer had performed correctly.

These issues were remedied by cleaning and adjustment of the TCIP and TPI contacts. On one occasion the tap position resistors were found outside of original design tolerance. A working day per circuit outage was required to make the necessary cleaning, adjustments and replacements at each of the affected sites.

Tap change fail alarm resetting philosophy within the Electricity North West control room had to be reviewed and streamlined: Following the initial CLASS Trials and subsequent business-as-usual (BAU) operation, it was observed that a significantly higher than normal number of tap change fail alarms were being received due to the tap relay change. This led to a review of the tap change fail alarm design and implementation philosophy.

The key output from this review was a recommendation that all such alarms to the Electricity North West control room should reset when the field contact resets and that no on-site physical resetting should be required to clear this alarm to the Electricity North West control room. In order to upgrade the Electricity North West network efficiently, BAU practice requires that when a legacy automatic voltage control (AVC) scheme is changed, existing legacy alarm annunciators are retained. This leads to hand reset tap change fail alarms still being used to inform the Electricity North West control room of a tap change fail event. The review recommended that BAU for AVC replacement should be to retain the legacy alarm annunciator but to send directly the MicroTAPP alarms to the Electricity North West control room, the hand reset flag being retained for local indication only.

Customers who were surveyed have noticed no changes to their electricity supply, or any adverse effects on their electrical appliances since the Trials commenced. In line with the CLASS customer survey methodology, a series of formal customer surveys have been undertaken after relevant Trials are completed. In total, 696 customers, comprising of 496 domestic and 200 commercial customers are being surveyed as part of CLASS.

The full suite of four seasonal monitoring surveys, conducted during the period April 2014 and May 2015 has now been completed. The demographically diverse range of customers selected to take part in the surveys, from across all Trial networks, have completed a maximum of 4 seasonal surveys along with a baseline study, in line with the CLASS customer survey methodology. The surveys were designed to identify genuine

changes to power quality perceptions, rather than any effects noticed due to heightened sensitivity to the Trials which could occur as a result of being part of the customer engagement. Therefore, the surveys were split so that for each CLASS Trial that prompted customer surveys, half of the surveys administered were Test surveys (conducted in relation to a real CLASS test) and half were control (where no CLASS test had actually taken place during that time period).

Detailed analysis of the final spring survey has now been undertaken to supplement the finding of the three previous seasonal surveys. The latest results support those of the previous monitoring seasons in that there has been no statistically significant change in customers' perception of their electricity supply or any adverse effects on the performance of electrical appliances since the Trials commenced.

Notably, the proportion of customers that had not noticed any difference in the quality of their electricity supply or the performance of appliances during the seven days preceding a survey increased to 85% overall during the Trial period, representing an increase of 6% from the baseline study of 79%.

Analysis of aggregated customer survey data, across all monitoring seasons, demonstrates that CLASS had no adverse impact on customers' satisfaction with Electricity North West's service. Notably, overall customer satisfaction increased from the baseline score of 89% to 98%, representing a 9% increase in customer satisfaction during the Trial period.

Overall, 95% of customers who took part in the four monitoring surveys were satisfied with their electricity supply and those customers in the test groups were found no more likely to report changes to their power quality than those in the control groups.

7 BUSINESS CASE UPDATE

The Project team are not aware of any developments that have taken place since the issue of the CLASS Project Direction that affects the business case for the Project.

8 PROGRESS AGAINST BUDGET

The Project Budget as defined in the Project Direction is shown in Appendix C.

Actual spend to date compared to Project Budget is summarised in Table 8.1 below. The report includes expenditure up to and including 31 May 2015.

It will be noted that the Project is currently performing favourably relative to budget. Project expenditure as at the end of May 2015 was £6,522,000 compared to a cost baseline of £7,779,000

Table 8.1: Summary of Project expenditure

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to Date			Total Project		
	Actual	Budget	Variance	Forecast	Budget	Variance
Summary						
Labour	1,711	1,850	139	1,899	1,948	49
Equipment	911	1,141	230	952	1,141	189
Contractors	3,186	3,505	319	3,470	3,644	174
IT	219	267	48	243	287	44
Payments to users	78	141	64	86	141	55
Contingency	220	591	372	226	595	368
Other	197	283	87	281	341	60
Total Costs	6,522	7,779	1,258	7,157	8,098	941

Detailed expenditure is shown at Appendix D at Project activity level.

9 BANK ACCOUNT

The CLASS Project bank statement is shown in Appendix E. The statement contains all receipts and payments associated with the Project up to the end of May 2015.

10 INTELLECTUAL PROPERTY RIGHTS

Electricity North West is following the default IPR arrangements. No IPR have been generated or registered during the reporting period.

The IPR implications of forthcoming Project deliverables is currently being considered, and will be reported in the next Project progress report.

11 ACCURACY ASSURANCE STATEMENT

This document has been reviewed by a number of key business stakeholders. The Project team and select members of the CLASS Project steering group, including the lead member of the bid development team have reviewed the report to ensure its accuracy. The narrative has also been peer reviewed by the Electricity North West future networks manager and the Electricity North West networks strategy and technical support director.

The financial information has been produced by the CLASS Project manager and the Project's finance representative who review all financial postings to the Project each month in order to ensure postings are correctly allocated to the appropriate Project activity. The financial information has also been peer reviewed by the Electricity North West Head of Business Performance.

Issue of the document has been approved by the networks strategy & technical support director.

APPENDIX A: STATUS OF RISKS FROM THE FULL SUBMISSION

Risk description	Category	Owner	Likelihood	Impact	Status	Comments
Resources are not mobilised in time, resulting in Project delay	Other	Electricity North West	Very low	Moderate	Closed	All Electricity North West resources are in place. Furthermore, all Project partners are fully mobilised
Delay to installation of voltage controllers due to resourcing constraints	Installation	Electricity North West	Low	Moderate	Closed	Installation of the autonomous substation controllers (ASCs) has been completed
Older primary substation sites may have incomplete layout drawings	Installation	Electricity North West	Fairly likely	Very low	Closed	Risk closed with completion of installation
Delay to connecting the ICCP link to Electricity North West's and National Grid's control system	Installation	Electricity North West/ National Grid	Low	Moderate	Closed	ICCP link installed and operational
Establishment of the ICCP link could impair Electricity North West's and National Grid's systems and processes	Installation	Electricity North West/ National Grid	Very low	Moderate	Closed	Link installed
National Grid may be unable to undertake their responsibilities in executing some of the Trials, due to other commitments	Installation	Electricity North West/ National Grid	Very low	Moderate	Closed	The CLASS Trials have been completed
Trials could compromise Electricity North West's and National Grid's security of supply commitments	Other	Electricity North West/ National Grid	Very low	Significant	Closed	The CLASS Trials have been completed
Conflicts may occur between Trials and unknown planning/maintenance works at specific primary substation sites	Installation	Electricity North West/ National Grid	Very Low	Moderate	Closed	The CLASS Trials have been completed.

Risk description	Category	Owner	Likelihood	Impact	Status	Comments
Customers in the Trial areas have voltage optimisers fitted, thus concealing the impact of the Trials	Other	Electricity North West	Low	Moderate	Closed	The CLASS Trials have been completed.
Customers in the Trial areas notice a change in their voltage levels because of the Trials being undertaken	Other	Electricity North West	Very Low	Low	Closed	Risk closed following the completion of the trials.
Potential for poor customer participation due to complexity of CLASS	Recruitment	Electricity North West	Low	Significant	Closed	Risk closed following the completion of the trials.
Placebo effect amongst survey participants	Other	Electricity North West	Low	Moderate	Closed	Risk closed following the completion of the trials.
Potential for attrition amongst survey participants between surveys	Recruitment	Electricity North West	Low	Moderate	Closed	Risk closed following the completion of the trials.
University of Manchester undergoes personnel changes during the Project	Other	Electricity North West/ University of Manchester	Low	Low	Open	The contract with the University of Manchester ensures that all deliverables involve multiple individuals to minimise this risk. Furthermore, clearly defined timeframes have been included in the contract
Learning is not disseminated effectively to all stakeholders	Other	Electricity North West	Very low	Moderate	Open	CLASS dissemination activities have already commenced and a diverse range of tools are being used to engage stakeholders. These include webinars, podcasts, social media, a dedicated CLASS website, newsletters, etc
Electricity North West may not be able to respond to OC6 within the Project area because of an ongoing	Other	Electricity North West	Very low	Significant	Open	As National Grid is a CLASS Project Partner, any issue around compliance with OC6 will be addressed with National Grid as a matter of urgency

Risk description	Category	Owner	Likelihood	Impact	Status	Comments
initiated Trial						
Customers may be confused by the various 'green energy' government initiatives currently ongoing	Recruitment	Electricity North West	Moderate	Moderate	Closed	Risk closed following the completion the trial.

As the Project progresses, the Project team will gain a better view of the likelihood of these risks and will also identify more evidence-based ones.

APPENDIX B: SUMMARY OF PROJECT SDRC

SDRC (evidence)	Due date	Status
Webinar 1	Jun-13	Delivered
Send for approval the customer engagement plan and data privacy statement to Ofgem by July 2013	Jul-13	Delivered
Publish the site selection report including the methodology by August 2013	Aug-13	Delivered
CLASS website and CLASS website and social media forums is live by September 2013	Sep-13	Delivered
Publish on CLASS website map of Trial areas by September 2013	Sep-13	Delivered
Publish on CLASS website customer marketing/campaign materials by September 2013	Sep-13	Delivered
Publish on CLASS website first video podcast by September 2013	Sep-13	Delivered
First customer workshops held by October 2013	Oct-13	Delivered
Active participation at annual LCNI conference 2013	Nov-13	Delivered
Final customer workshops held by December 2013	Dec-13	Delivered
Publish on CLASS website Trials and test regime report in January 2014	Jan-14	Delivered
Publish on CLASS website control group and Trial areas customer communication by January 2014	Jan-14	Delivered
Publish the design of the regulation scheme for substation voltage controllers by February 2014	Feb-14	Delivered
Network monitoring equipment installed and commissioned by March 2014	Mar-14	Delivered
ICCP installed and commissioned by March 2014	Mar-14	Delivered
Publish the commissioning reports by April 2014	Apr-14	Delivered
Technology go-live by April 2014	Apr-14	Delivered
Publish the ICCP commissioning reports by April 2014	Apr-14	Delivered

SDRC (evidence)	Due date	Status
Baseline customer survey initiated in April 2014	Apr-14	Delivered
Learning event 1	Apr-14	Delivered
Webinar 2	Jun-14	Delivered
Evidence of test Trial data transferred by July 2014	Jul-14	Delivered
Learning event 2	Jul-14	Delivered
Publish on CLASS website video podcast 2 by 15 August 2014	Aug-14	Delivered
Publish on CLASS website an initial capability report for all the Trial scenarios by September 2014	Sep-14	Delivered
Raw monitoring data downloadable from CLASS website by September 2014	Sep-14	Delivered
Active participation at annual LCNI conference 2014	Nov-14	Delivered
Publish on CLASS website video podcast 3 by 8 December 2014	Dec-14	Delivered
Monitoring data is updated on CLASS website by December 2014	Dec-14	Delivered
Publish on CLASS website interim network modelling and analysis reports by January 2015	Jan-15	Delivered
Publish on CLASS website interim profile modeling study by January 2015	Jan-15	Delivered
Publish on CLASS website interim asset health study report by January 2015	Jan-15	Delivered
Webinar 3	Mar-15	Delivered
Monitoring data is updated on CLASS website by April 2015	Apr-15	Delivered
Customer surveys completed, with an initial summary report published by June 2015	Jun-15	On track
Publish on CLASS website NETS SQSS change proposal report by June 2015.	Jun-15	On track
Publish on CLASS website final network modelling and	Sep-15	On track

SDRC (evidence)	Due date	Status
analysis reports by September 2015		
Publish on CLASS website final profile modeling study by September 2015	Sep-15	On track
Publish on CLASS website final asset health study report by September 2015	Sep-15	On track
Publish on CLASS website customer survey report by September 2015	Sep-15	On track
Active participation at annual LCNI conference 2015	Nov-15	On track
Provide confirmation from National Grid that the long-term monitoring study has been initiated	Dec-15	On track

APPENDIX C: PROJECT DIRECTION BUDGET


£'000s Excluding Partner Funding Ofgem Cost Category	Plan
Labour	1,948
Data Management	32
Data routing configuration	99
Installation & configuration of Dashboard hardware & software	83
Monitoring Equipment	236
Project Management	1,035
Purchase & Installation of substation controllers	99
Publicity and Dissemination	20
SOAP Interface to PoF	156
Voltage Controllers interface	188
Equipment	1,141
Purchase & Installation of substation controllers	657
RTU installation	172
Monitoring Equipment	313
Contractors	3,644
Purchase & Installation of substation controllers	1,125
Installation & configuration of ICCP	27
Customer Survey	219
Development of Change Proposals	60
Carbon Impact assessment	41
Research - Technical	886
Project Management	912
Design of voltage regulation scheme	375
IT	287
Installation & configuration of Dashboard hardware & software	122
Installation & configuration of ICCP	165
Payments to users	141
Incentive to attract customers to complete surveys	141
Contingency	595
Installation & configuration of ICCP	147
Purchase & installation of monitoring equipment	124
Incentive to attract customers to complete surveys	33
Purchase & Installation of substation controllers	156
Installation & configuration of Dashboard hardware & software	78
Research - Technical	56
Other	341
Publicity and Dissemination	194
Accommodation	146
	8,098

APPENDIX D: DETAILED PROJECT EXPENDITURE

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to date			Total Project			Comments
	Actual	Plan	Variance	Forecast	Plan	Variance	
Labour	1,711	1,850	139	1,899	1,948	49	
Data Management	43	32	(11)	43	32	(11)	Additional work to improve support for response to Customer calls
Data routing configuration	60	99	39	65	99	34	Efficiencies identified that reduce required works
Installation & configuration of Dashboard hardware & software	74	83	10	75	83	9	
Monitoring equipment	223	236	13	223	236	13	
Project Management	876	941	65	1,050	1,035	(15)	Minor additional costs incurred
Purchase & installation of substation controllers	106	99	(6)	104	99	(5)	
Publicity and Dissemination	0	15	15	9	20	10	Underspend due to costs being embedded in other project costs
SOAP interface to PoF	142	156	14	142	156	14	
Voltage Controller interface	187	188	0	187	188	0	
Equipment	911	1,141	230	952	1,141	189	Efficiencies identified.
Purchase & installation of substation controllers	589	657	68	626	657	31	
RTU installation	16	172	156	16	172	156	Scale of RTU installation work was found to be lower than planned
Monitoring equipment	307	313	6	311	313	2	
Contractors	3,186	3,505	319	3,470	3,644	174	
Purchase & installation of substation controllers	1,003	1,125	122	1,012	1,125	114	
Installation & configuration of ICCP	33	27	(5)	33	27	(5)	Minor additional work identified
Customer Survey	196	219	23	244	219	(25)	Additional work identified to confirm robustness of survey results
Development of Change Proposals	8	60	52	59	60	1	
Carbon Impact assessment	0	41	41	41	41	(0)	
Research Technical	694	785	90	830	886	55	
Project Management	895	873	(22)	895	912	17	
Design of voltage regulation scheme	357	375	19	357	375	19	
IT	219	267	48	243	287	44	
Installation & configuration of Dashboard hardware & software	47	102	55	71	122	51	ENWL efficiencies found during install and configuration
Installation & configuration of ICCP	172	165	(7)	172	165	(7)	Minor additional work identified
Payments to users	78	141	64	86	141	55	Efficiencies identified but awaiting final review of payments made
Incentive to attract customers to complete surveys	78	141	64	86	141	55	
Contingency	220	591	372	226	595	368	
Installation & configuration of ICCP	22	144	122	22	147	125	Additional work item by partner
Purchase & installation of monitoring equipment	46	124	78	53	124	71	Additional Grid Key (LV monitoring) device costs
Incentive to attract customers to complete surveys	0	33	33	0	33	33	
Purchase & installation of substation controllers	152	156	5	152	156	5	Additional unplanned work (Argus8) identified at 12 sites
Installation & configuration of Dashboard hardware & software	0	78	78	0	78	78	
Research Technical	0	56	56	0	56	56	
Other	197	283	87	281	341	60	
Publicity and Dissemination	135	155	20	195	194	(0)	
Accommodation	62	128	66	86	146	61	ENWL efficiencies found.
	6,522	7,779	1,258	7,157	8,098	941	

APPENDIX E: PROJECT BANK ACCOUNT

The bank statement below details all transactions relevant to the Project. This includes all receipts and payments associated with the Project up to the May 2015 month end reporting period.

 Lloyds Bank		Yesterday's Statement		C082421		
Statements and Balances						
300002-01813272						
ELECTRICITY NWL NO.12 LCNF (CLASS) (GBP)						
Date	Type	Narrative	Value Date	Payments	Receipts	Balance
01DEC14		Opening Ledger Balance				2,843,901.19 Cr
09DEC14	CR	INTEREST (GROSS)			1,129.77	2,845,030.96 Cr
29DEC14	DR	SERVICE CHARGES REF : 159773777		1.10		2,845,029.86 Cr
09JAN15	CR	INTEREST (GROSS)			1,208.16	2,846,238.02 Cr
09FEB15	CR	INTEREST (GROSS)			1,208.68	2,847,446.70 Cr
09MAR15	CR	INTEREST (GROSS)			1,092.17	2,848,538.87 Cr
20MAR15	DR	TO A/C TFR 02749020 300002		153,006.96		2,695,531.91 Cr
20MAR15	DR	TO A/C TFR 02749020 300002		64,420.27		2,631,111.64 Cr
23MAR15	DR	TO A/C TFR 02749020 300002		388,548.89		2,242,562.75 Cr
23MAR15	DR	TO A/C TFR 02749020 300002		145,445.37		2,097,117.38 Cr
24MAR15	DR	TO A/C TFR 02749020 300002		488,968.41		1,608,148.97 Cr
27MAR15	DR	SERVICE CHARGES REF : 166494199		1.02		1,608,147.95 Cr
09APR15	CR	INTEREST (GROSS)			901.57	1,609,049.52 Cr
11MAY15	CR	INTEREST (GROSS)			705.34	1,609,754.86 Cr
01JUN15		Value of Credits (6)			6,245.69	
01JUN15		Value of Debits (7)		1,240,392.02		
01JUN15		Closing Ledger Balance				1,609,754.86 Cr
01JUN15		Closing Cleared Balance				1,609,754.86 Cr

*** End of Report ***