



C₂C

Capacity to Customers Project Progress Report (PPR)

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CONTENTS

Version history	2
Approval	2
Contents	3
Glossary of terms	4
1 Executive summary	5
2 Project managers' report	9
2.1 General Project Management	9
2.2 Technology Workstream	9
2.3 Customer and Commercial Workstream	9
3 Consistency with full submission	10
4 Risk management.....	10
4.1 Risks and issues experienced during reporting period	10
4.2 Risks that existed at time of documenting the Project Full Submission	12
5 Successful delivery reward criteria.....	13
6 Learning outcomes	14
7 Business case update.....	18
8 Progress against budget	18
9 Bank account.....	19
10 Intellectual Property Rights (IPR).....	19
11 Other.....	20
12 Accuracy assurance statement	20
APPENDIX A –Project Budget	21
APPENDIX B – Re-based Project budget (approved 24 January 2013).....	22
APPENDIX C – Detailed Project expenditure	23
APPENDIX D – Project Bank Account	24

GLOSSARY OF TERMS

Abbreviation	Term
CEP	Customer Engagement Plan
CRMS	Control Room Management System
C ₂ C	Capacity to Customers
DPS	Data Protection Statement
I&C	Industrial & Commercial
MPAN	Meter Point Administration Number
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
NMS	Network Management System
GE PoF	GE PowerOn Fusion Network Management System
GSM	Global System for Mobile Communication (GSM)

All other definitions shown starting with a capital letter are as per Low Carbon Networks Fund Governance Document v.6

1 EXECUTIVE SUMMARY

The C₂C Project was authorised to commence in January 2012 and is due to complete in December 2014. The aim of the Project is to test new technology, network operational practices (ie closed HV rings), the customer experience of being connected to a closed ring and commercial demand response contracts that will allow Electricity North West to increase the loadings on a selection of Trial circuits representing approximately 10% of our HV network without resorting to conventional network reinforcement. In other words to 'release' inherent spare capacity in the HV system in order to accommodate the future forecast increases in demand whilst avoiding (or deferring) the cost and environmental impacts that are associated with traditional network reinforcement. The Project consists of customer and commercial; technology; and learning and dissemination Workstreams.

The Project has developed and is now trialling new demand response contracts that will allow Electricity North West to manage the import or export capacity of either existing or new connections customers on the Trial circuits under fault or abnormal system conditions. Existing customers are receiving regular monthly payments in exchange for the managed contract, whereas new connections customers are being offered the option to sign up to a connection contract with demand response obligations in exchange for a reduced connection / reinforcement charge.

In the event that a fault occurs on or adjacent to the HV network feeding such a customer, the contract will allow Electricity North West to manage all or part of their import or export capacity, if required by the network, to enable Electricity North West to restore customers' supplies in as short a time as possible. It is envisaged that many future customers may opt for part of their demand to be managed in this manner in exchange for reduced connection charges.

The Project commenced the live Trial phase in April 2013 and this will continue until September 2014. There has been considerable customer engagement throughout the Project both in preparation for Trial go-live and since go-live. This will continue throughout the Trial period.

The Project actual costs to date are £7.6m and the estimated at completion costs is now £8.7m, which is £1.5m favourable to Project Budget (including contingency).

Progress to date

This report is the fifth Project Progress Report and covers the period December 2013 to May 2014 inclusive. The Project is on track and key highlights to date are;

Ongoing customer engagement element of the project is progressing well.

- We have performed 23 post fault customer surveys on C₂C circuits and early findings support the hypothesis that customers experience/perceive a shorter restoration time.
- We have also performed 11 surveys of customers who have either accepted or rejected a C₂C contract in order to enhance our understanding of the motives and barriers to take-up.

The above interviews will continue throughout the trial to allow for qualitative analysis to be undertaken. An overview of current findings can be found in the lessons learned section of this report.

We will continue to monitor and sample survey customers connected to the trial circuits to measure their perception of power quality/reliability of being connected to a trial circuit. We will also compare the perceptions of those customers on trial circuits (test group) to those that are not (control group).

Recruitment of new connections customers has been challenging

This element of the project has been adversely affected by the economic downturn resulting in lower overall system demand and hence fewer qualifying applications requiring reinforcement. This situation has been exacerbated by other LCNF work which has progressed into BAU increasing existing network capacity. As a consequence we have been able to offer fewer C₂C managed connection agreements than originally envisage to new connections customers as these only benefit customers when reinforcement is required.

We have currently signed one new connection contract and have 13 new connection opportunities that we are pursuing. We are continuously monitoring this element of the project. However, with four months of the Trial remaining given the present economic conditions it is difficult to predict if the target of ten contracts will be achieved. We are considering if it will be necessary to extend the Trial beyond the current end date of September 2014. This would involve extending the software licences and support for the GE PowerOn Fusion product and maintaining the commercial Workstream resources. Both of these activities are currently outperforming budget and it is therefore likely that such an extension, if it were required, could be funded without exceeding the Project Budget. At this stage we are not requesting any such extension and we will closely monitor progress regarding new customer contracts.

Recruitment of existing customers is complete

- We have achieved our SDRC relating to purchasing a minimum of ten existing customer contracts.
- We have purchased 10 contracts and generated learning using two of the three routes to market, namely direct and via an agent. Any remaining contracts we purchase will be via Flexitricity ie the third and final route to market.
- During the current reporting period we have conducted a proof of concept Trial aimed at demonstrating a low cost method of a DNO initiating a trip of a circuit breaker controlled by an aggregator. This is essential to enable the third route to market, namely contracts purchased via an aggregator.

During the reporting period the Project has delivered six SDRC outputs, these are detailed below and in section 5.

Academic Research is progressing well

Apart from the technical requirements associated in deploying C₂C, the economic perspective of the C₂C solution needs to be understood. In this respect, The University of Manchester is conducting an economic benefits analysis to investigate whether or not the C₂C method or combinations of underlying solutions are economically sound, as well as understanding the key factors that engender or constrain value creation.

A deterministic scenario and optimisation based framework consistent with Ofgems' RIIO-ED1 CBA has been developed, it can identify optimal asset build strategies that may recommend implementing traditional reinforcements and C₂C interventions independently (ie, a reinforcement can be avoided via a C₂C intervention) or in combination (ie, some benefits can be gained by implementing both C₂C and reinforcement solutions). In addition, it will highlight the conditions that increase or decrease the economic attractiveness of the C₂C method.

The results of the preliminary analyses conducted for different scenarios indicate that the C₂C method can be a cost effective alternative to traditional reinforcement practices as it can result in significant investment and social costs reductions.

In order to properly capture the value associated with the C₂C solution, the framework will be further extended to consider (i) uncertainties associated with possible futures; (ii) including all the relevant components that can play a role in a CBA from different perspectives; (iii)

quantifying the costs and benefits of different competing options on a like for like basis, possibly taking into account available optimisation engines.

The University of Strathclyde is conducting detailed analysis and quantification of the technical effects of C₂C operation namely inherent network capacity, electrical losses and power quality. This work is based on simulation studies and on actual data from the live trial system.

The analysis method involves combining network data from a variety of sources to produce detailed models which represent the circuits involved in the trial.

Tyndall Centre for Climate Change Research at the University of Manchester is conducting studies to understand the carbon impacts of the C₂C project.

The approach is similar to that used by the Kyoto Protocols' Clean Development Mechanism. A baseline scenario has been constructed to represent business as usual capacity release through traditional reinforcement. A Life Cycle Assessment (LCA) will be performed for the assets used in the network reinforcement, totalling the greenhouse emissions embodied in their manufacture, transport, installation and disposal. The carbon impact from the assets and the operations of the network under the C₂C configuration will then be compared to this baseline and summed across defined time periods.

Table 1.1 Most significant SDRC delivered during the reporting period

Milestone	Workstream	Completion date
Submit project progress report number four to Ofgem	Dissemination	Dec-13
Publication of white paper number four	Dissemination	Dec-13
Publication of trade magazine article number nine	Dissemination	Jan-14
Publication of trade magazine article number ten	Dissemination	Mar-14
Network data available to stakeholders	Dissemination	Apr -14
Customer seminar number five (Connections applicants/ agents)	Dissemination	Apr-14

During the next reporting period the Project will seek to complete negotiations of at least ten post-fault demand response contracts with new customers, continuously monitor and model the effect of changes to the network running configuration, monitor any subsequent effects on Trial participants and customers connected to Trial circuits and continue to disseminate learning on an ongoing basis.

Summary of key risks

There is one risk associated with the achievement of a Project SDRC or maintaining consistency with the Full Submission. This risk is summarised below and described in detail in section four of this report.

Risk description	Category
Low economic activity and reduced system maximum demand may affect participation for new connections customers.	Recruitment

Summary of key learning outcomes delivered in the period

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

- Engagement with customers.
- Working with aggregators – Controlling aggregators' equipment.
- Purchasing DSR from new connection/ additional load customers.
- Analysing the effect of C₂C on the network.
- Accommodating DSR in ER P2-6.

Third Party dissemination activities

Event	Contribution	Date
UoS – 'Analysis and Quantification of the benefits of interconnected distribution system operation' APAP 2014, South Korea	Submitted	Dec 2013
UoM – 'Distribution Network Reinforcement Planning Considering Demand Response Support', PSCC 2014, Poland	Submitted Present	January 2014 August 2014
Save Project - Customer engagement lessons learnt workshop	Attended	January 2014
Trade publication - project update, E&T magazine	Published	January 2014
Delivering for the future seminar	Attended	February 2014
UoM – 'Distribution Network Capacity Increase via the use of Demand Response During Emergency conditions: A cost benefit analysis framework for Techno Economic Appraisal' CIRED 2014, Rome	Submitted Present	Feb 2014 June 2014
Trade publication - analysing the effects of new technology, E&T magazine	Published	March 2014
DSR forum	Presented	March 2014
Future of Utilities	Presented	March 2014
UoS – 'Increasing Distribution Network Capacity using Automation to Reduce Carbon Impact' DPSP 2014, Denmark	Presented	April 2014
WPD - LV network templates	Attended	April 2014
Fifth customer seminar	Presented	April 2014
UoM – C ₂ C concept presented at 'Electric Energy Systems – University Enterprise Training Partnership', Portugal	Presented	May 2014
Various electronic newsletters	Published	Various
National Grid demand customer seminar	Attended	May 2014

Internal dissemination activities

- Briefings to Connections business' system planners/ designers.
- Briefings and training to system planners regarding production of C₂C design and quotations.
- Company-wide briefings via our intranet and internal Newswire magazine.

2 PROJECT MANAGERS' REPORT

2.1 General Project Management

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

- Management of Project resources.
- Project monitoring and control.
- Internal and external stakeholder awareness.

During this reporting period the Project emphasis has continued to focus on Trial implementation. The key activities of the Project team have been purchase of connection managed agreements, customer engagement, data collections and analysis. Continuous internal stakeholder engagement has taken place in order to embed the Trial processes and obtain feedback from those involved. This process will continue as the Trial progresses as and when learning is generated that requires internal communication.

During the next reporting period significant Project management activities will be:

- Continued stakeholder engagement and management.
- Continued project monitoring and control.
- Preparation for Project closedown.

There are no Project management risks or issues that are 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:

- Installation of remote control devices at Trial participants' premises.
- Management of data retrieved from Trial networks.
- Continued work with University Partners to commence losses, power quality, carbon and economic benefit analysis work with the Universities of Manchester & Strathclyde

All SDRC that are associated with the above activities are complete or on track.

During the next reporting period, the Technology Workstreams' significant activities will be:

- Completion of losses, power quality, carbon and economic benefit analysis work with the academic Partners.
- Installation of remote control equipment at customers' premises and other locations as appropriate as and when Trial participants are secured.

There are no Technical Workstream risks or issues that are associated with delivery of a Project SDRC or maintaining consistency with the Full Submission.

2.3 Customer and Commercial Workstream

The most significant Customer and Commercial Workstream activities during the reporting period are listed below:

- Continued engagement with existing I&C customers.
- Continued direct engagement with new I&C demand and generator customers to secure new connections Trial participants.
- Customer seminars and briefings.

- Ongoing power quality monitoring customer surveys throughout the Trial to obtain feedback from customers connected to Trial circuits (test group) and customers not on trial circuits (control group) to allow for comparisons to be made.

With the exception of engagement with new demand or generation customers all SDRC that are associated with the above activities are complete or on track. As stated in the executive summary the activity of securing ten managed connection agreements has been affected by low economic activity and reduced system maximum demand due to a continuation of the economic recession in the North West region. This risk is described in full in section four of this document.

During the next reporting period the Customer and Commercial Workstreams' significant activities will be:

- Continued engagement with existing I&C customers.
- Continued direct engagement with new I&C demand and generator customers to secure new connections Trial participants.
- Customer seminars and briefings.
- Ongoing power quality monitoring customer surveys throughout Trial to obtain feedback from Trial participants and domestic customers connected to Trial circuits.

There is one Commercial risk associated with the achievement of a Project SDRC or maintaining consistency with the Full Submission. These risks are summarised below and described in detail in section 4 of this report.

Risk description	Category
Low economic activity and reduced system maximum demand may affect participation for new connections customers.	Recruitment

3 CONSISTENCY WITH FULL SUBMISSION

During the previous reporting period Ofgem approved a change request associated with the project under clause 3.101 of the Low Carbon Networks Fund Governance Document v.6. This change was in relation to the involvement of Enernoc (one of our aggregator Partners). Enernoc declined to participate in the tender exercise that was undertaken in order to agree the recruitment processes and the costs for Partners to purchase C₂C demand response from our existing customer base. The contract to procure up to ten C₂C agreements from existing customers was subsequently awarded to npower. With the exception of the above change the Project is being undertaken in accordance with the Full Submission.

4 RISK MANAGEMENT

4.1 Risks and issues experienced during reporting period

Recruitment Risks

There is currently one recruitment risks that are associated with the achievement of the Project SDRCs or maintaining consistency with the Full Submission.

Low economic activity and reduced system maximum demand may affect participation for new connections customers (R023) - Status: Open – Likelihood: Moderate, Impact: Significant

Risk: There is a risk that we may not secure ten demand response contracts with new customers, leading to failure to achieve a Project SDRC, because of lower than anticipated economic activity and reduced system maximum demand in the North West region.

Action plan:

We have performed a number of actions to mitigate this risk. The first proactive action was taken during Trial circuit selection activity where connections market activity was a key criterion for assessing suitability of the circuit for inclusion in the Trial. Since December 2012 we have increased engagement with developers to reinforce and cement awareness of the opportunities that may exist to obtain lower cost connection quotations. We have been closely monitoring new connections applications on the C₂C circuits. In addition to this we have also performed a number of other actions such as:

1. Review of all non C₂C applications that have expired or are about to expire. There may be opportunities to re-design and re-quote based on the C₂C design principles to customers who have not accepted on the basis of the original quote being too high.
2. Review of all accepted 'non C₂C quotations' that have gone into construction but not yet started on site. Some of these may be eligible for and benefit from being re-designed and re-quoted based on the C₂C design principles. In all cases this would be by agreement with the customer. And subject to an eligibility test (ie in the trial area).

To date we have currently signed one new C₂C connection contract. We currently have 146 applications that are 'on or near' a trial circuit. However, due to the reduction in system maximum demand and other LCNF work that has progressed to BAU only 13 of these require a circuit to be reinforced such that a lower cost C₂C quote can be offered to the customer.

The table below shows the decrease in maximum demand associated with the Trial circuits from 2010/11 onwards. This demonstrates a reduction of approximately 6.6% since the creation of the project Full Submission.

	2010/11	2011/12	2012/13
MD all C2C Primary Substations	2,049.39	1,954.02	1,923.11
% change from 2010/11	0.0%	-4.9%	-6.6%

During the current period we have presented 12 customers with C₂C options, we would categorise six as being 'likely to sign'. However, a further challenge we face is that despite a connections offer being made, the customer may not be in a position to accept within the timescales that align to the Trial end date.

Summary

The economic recession has resulted in a general decline in demand that has resulted in a 6.6% reduction in maximum demand on the Trial circuits since the Full Submission was prepared. To put this in context, on a 7.5MVA rated 11kV circuit this could equate to 450kVA additional available capacity. When combined to form a ring, this could result in possibly two connections being made to the network without the need for reinforcement that at the time of producing the Full Submission would have triggered reinforcement. Considering there are over 150 closed rings involved in the Trial, this means that over 300 new connection offers could now be made without the need for reinforcement that, based on 2010 demand, would have triggered reinforcement.

We are optimistic that a number of the applications that are currently eligible will be converted into accepted C₂C new connections agreements. We have also generated extremely useful learning and dissemination material from this activity despite the number of contracts signed. Interim lessons learned from this activity are detailed in section six and a full analysis will be included in the Project Closedown Report in December 2014.

Procurement, Installation and Other

Risks

There are currently no Procurement, Installation or Other risks that affect our ability to deliver the Project as described in the Full Submission.

4.2 Risks that existed at time of documenting the Project Full Submission

The narrative below refers to risks that existed at time of submission and were detailed in Appendix 2 of the Full Submission.

Recruitment Risks

No recruitment risks were detailed in Appendix 2 of the Full Submission.

Procurement Risks

Risk 8 – Project Partners walk away once Project is won - Status: Controlled

We have signed contracts with GE Energy, PB Power, npower and our University Partners who are all actively engaged in the Project. As described in section three of this report, Enernoc has declined to actively participate in the purchase of C₂C DSR agreements for strategic commercial reasons. We continue to work with our Partners in order to complete their work packages and prepare learning and dissemination material for Project Closedown.

Installation Risks

Risk 1: Risk that internal Operations team will not be able to support installation of automated devices - Status: Controlled

The majority of installation work has now been completed. The only installation work remaining is the installation of equipment at Trial customers' premises as and when they sign contracts. Our Technology Workstream is liaising directly with the installation resource and no issues are foreseen over the remainder of the Project.

Risk 6 – Network equipment cost overruns - Status: Controlled

This activity has been completed within budget.

Other Risks

Risk 2: Risk that key personnel will not be available to deliver the Project - Status: Controlled

The Project delivery team has been recruited and are part of the same department as the bid development team, which supported the delivery team during the mobilisation stage of the Project. The Project is now past its most intensive period and is sufficiently resourced to deliver the remainder of the Project.

Risk 3: Risk of problems with the financial control of the Project because of the new requirement for a separate bank account - Status: Controlled

The Project Bank Account has been set up and monthly processes have been put in place to review receipt and payments on a monthly basis.

Risk 4: Failure to achieve low carbon saving - Status: Open – Likelihood: Moderate, Impact: Significant

This aspect of the Project is being investigated by our Partner, Tyndall Centre (for Climate Change) at University of Manchester. Their approach is similar to that used by the Kyoto Protocols' Clean Development Mechanism. A baseline scenario has been constructed to represent business as usual capacity release through traditional reinforcement. A Life Cycle Assessment (LCA) will be performed for the assets used in the network reinforcement, totalling the greenhouse emissions embodied in their manufacture, transport, installation and disposal. The carbon impact from the assets and the operations of the network under the C₂C configuration will then be compared to this baseline and summed across defined time periods.

Action plan: Complete analysis and publish findings via standalone publications and through Project learning and dissemination materials.

Risk 5: Poor Project management - Status: Controlled

The Project team has been recruited. The Project manager is a member of the Project Management Institute and holds Professional Project Manager credentials (PMP). Weekly and monthly Project governance meeting have been established and implemented. These include monthly updates to the sponsoring director.

Risk 7 – Payment to customer cost overruns - Status: Controlled – Likelihood: Moderate, Impact: Low

This risk is now controlled. We have now purchased the minimum of ten agreements with existing customers within the Project Budget of £300k. Five agreements have been purchased directly and five via npower acting as our agent.

5 SUCCESSFUL DELIVERY REWARD CRITERIA

During the reporting period, six planned SDRC were delivered. These are detailed in table 5.1 below.

Table 5.1 SDRC delivered in reporting period

Milestone	Planned date	Completion date	Comments
Submit project progress report number four to Ofgem	Dec-13	Dec-13	Completed
Publication of white paper number four	Dec-13	Dec-13	Completed
Publication of trade magazine article number nine	Jan-14	Jan-14	Completed
Publication of trade magazine article number ten	Mar-14	Mar-14	Completed
Network data available to stakeholders	Apr -14	Apr -14	Completed
Customer seminar number five (Connections applicants/ agents)	Apr-14	Apr-14	Completed

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

Table 5.2 SDRC look ahead

Milestone	Planned date	Forecast date	Comments
Submit project progress report number five to Ofgem	Jun-14	Jun-14	On track
Publication of white paper number five	Jun-14	Jun-14	On track
C ₂ C managed connections contracts in place	Sep-14	Sep-14	On track
Present to industry conference number five (Electricity North West knowledge sharing event)	Dec-14	Nov-14	On track
Present to LCN Fund Annual Conference by 2014	Dec-14	Oct-14	On track
Demand response capability test completed	Dec-14	Dec-14	On track
Publication of white paper number six	Dec-14	Dec-14	On track
Closedown report submitted to Ofgem	Dec-14	Dec-14	On track

During the next reporting period none of the SDRCs are forecast to be delivered at variance to the planned dates contained within the Project plan appended to the Full Submission.

6 LEARNING OUTCOMES

We have established a Project website which is used as a repository for sharing Project learning to interested stakeholders. The learning outcomes during the period are described below.

Lesson 1: Engagement with customers (Power Quality Monitoring initial findings)

Background: Now that the Trial is live surveys are being conducted to monitor the effects of the Trial on customers in three areas:

1. Measuring customer perceptions of their power quality and reliability ie fault frequency, duration, dips and spikes throughout the trial period.
2. Comparing the perceptions of those customers who are not on C₂C circuits (control) to those that are (test).
3. Comparing the perceptions of both test and control customers to reality by comparing customer survey data with actual fault frequency and duration.

So far 429 interviews have been completed, predominantly with domestic customers. The results of these surveys have been weighted to ensure that the control and test groups have a matched customer profile allowing comparisons to be made.

Lessons learned

1. Equal proportions of all customers in Trial areas and non-trial areas perceived fewer faults since the C₂C trial began in April 2013 (12% v 13% of respondents).
2. Equal proportions of customers in Trial areas and non-trial areas perceived fewer dips or spikes in their supply compared to non-trial areas (5% v 7% of respondents).

3. Twice as many domestic customers in non-trial areas said that the frequency of faults had increased (4% trial v 8% non-trial) and an equal proportion said they had decreased (11% v 13%).
4. Power quality amongst domestic customers in trial areas who have not experienced any faults has improved for both frequency (net improvement of 8%) and dips and spikes (net 2%) which are both better than observations amongst domestic customers on non-trial circuits (5% and -3% respectively).

Further comments

These findings suggest that for trial customers, the introduction of C₂C improves perceptions of their experience of faults. Faults under C₂C conditions are sometimes difficult for customers to detect given that nearly half of customers who said they experienced a fault actually did not. It could be that what customers are detecting are actually dips and spikes rather than faults. The ongoing power quality monitoring survey will be repeated in August 2014 before the trial is completed to allow for further quantitative analysis to be undertaken.

Lesson 2: Working with aggregators – Utilising aggregators equipment

Background: In order for DNOs to use aggregators to despatch load under fault conditions it has been necessary to develop a low cost solution to initiate a demand response using the aggregators' equipment. The original planning assumption was that a communication would take place between the Electricity North West control system and the aggregator control engineer who would then initiate the demand response. As the technical solution developed it became clear that the control/ operation of all load control equipment needs to take place within the dead time immediately after a fault so that the restoration process can commence in order to restore supplies via our automatic restoration system without delay.

In order to develop a solution that met the technical requirements an alternative concept trial has been conducted at a C₂C Trial participant's site.

Lessons learned

1. In order to ensure operation of the load control device within the required time period ie 180 seconds, it would have been necessary to establish a direct connection between the Electricity North West Control system and the aggregators' IT system. This proposed solution was discounted on the basis that it may have compromised the integrity of the Electricity North West control system.
2. The second proposed solution was to use the Electricity North West control system to send a voice message to the aggregator control room with an instruction to disconnect the load. This option was discounted because it was not possible to achieve the required demand response timescales.
3. The requirement for the aggregators' control room staff to have adequate training and operational authorisation to operate a DNO HV switch was also considered but it was decided that utilising an aggregators' outstation to control a DNO switch was not feasible.

The trial involves controlling the load using a standard Electricity North West solution of an RTU connected to an actuator which would be controlled via the standard automation software. However, in order to prove the alternative concept of using an aggregators control system Electricity North West and Flexitricity worked together in order to develop a solution that involved a discrete connection between the Electricity North West RTU and the Flexitricity outstation. This provides a low cost secure means of operating a switch controlled by an aggregators' outstation with the trip signal being initiated by the DNO control system. The solution also provides circuit state indication to the aggregator control room so that both control engineers are aware of the status of the load control device.

Further comments

This alternative concept trial has been conducted on a C₂C Trial participant's site and involved a customer that had been signed directly by Electricity North West and whose load control device was controlled by an Electricity North West RTU. The trial has proved that Electricity North West and aggregator equipment can be co-located at a customer's premise and that an aggregator's load control device could be controlled via the DNO RTU sending a trip signal to the aggregator outstation.

Lesson 3: Purchasing DSR from new connection/ additional load customers

Background:

Section 9.7 of the Full Submission document committed to enter into managed agreements with demand and/or generation customers or their agents, at least ten of which from connections customers during the trial period from April 2013 to September 2014.

To achieve this it was planned to support the existing connections business with dedicated C₂C connections resource in order to manage the marketing, customer engagement and customer relations with new I&C customers and developers seeking connection to a HV or EHV trial circuit. The C₂C solution would mitigate the requirement to reinforce the network (as per standard design), however the restoration of the customer's supply may be managed during a fault event.

The C₂C connections team have reviewed 620 applications from I&C and generator customers whose site was on/near a trial circuit. From these, 67 applications have required reinforcement (or connected to an alternative circuit to avoid the requirement to reinforce the network).

To date we have offered managed agreements to 12 customers, one has accepted, four declined the C₂C offer, and seven of are still considering their offers.

As highlighted in chapter four there has been a lower than anticipated number of opportunities throughout the Trial period, this is due to a reduction in the maximum demand of the primary transformers supplying the trial circuits of 6.6%, from 2009 to 2013. To put this in context, this could equate to 300kVA to 495kVA additional available capacity per HV circuit depending on circuit voltage. When combined to form a ring, this could result in possibly two connections being made to the network without the need for reinforcement that previously would have triggered reinforcement. Considering there are over 150 closed rings on the trial, this means that approximately 150¹ connections offers could now be made without the need for reinforcement that, based on 2010 demand would have triggered reinforcement.

Lessons learned

1. **Customer negotiations - getting to speak to the decision makers** - Though we were aware that the managed agreement had to be entered into by the end user, we did not fully anticipate the complexity of the work involved in articulating the C₂C proposition to the key decision makers within the end user organisation. We now know that in most cases the original requester does not have the decision making powers to accept the C₂C connection and that we need to be present the C₂C concept and the proposed C₂C connection arrangements several times as the connection offer rises through the organisation to the key decision maker. A considerable amount of effort has been invested in briefing and re-briefing customer

¹ Based on an average HV load applied for of 764kVA since Jan 2011.

employees or agents. This has resulted in a much longer negotiation period than anticipated.

Agents acting on behalf of customers (eg IDNOs, ICPs, consultants, developers) often did not have an incentive to seek a C₂C solution. C₂C only benefits the end user, and not a customer's agent. On occasion this made it difficult to negotiate beyond the customers' agent and actually reach the key decision maker. We envisaged this was a potential issue, and in December 2012 we invited the key players in Electricity North West's connections market to an event, to introduce them to the C₂C concept. The event presented the benefits of the trial to our customers in two ways. It outlined the potential of a cost saving on a new or additional load connection, as well as the larger benefits to the future of the UK electricity industry. To encourage agents to seek a C₂C solution, we reminded them of the competition in Electricity North West's connections market, and suggested that it would be in their best interest to seek a C₂C solution when offered, with their customers to mitigate the risk of being outbid by a competitor.

2. **Perceived impact of C₂C on customers with process operations** - For some customers with a manufacturing process, a failure of supply can often lead to the loss of revenue due to a break in their production. Process orientated customers were conscious that operating our network in a closed ring configuration, would potentially increase the number of fault events on their circuit. Some customers perceived that a disruption to their power supply, albeit of less than 3 minutes, could still result in the loss of production. For example, a customer may have lost one production day every three years prior to C₂C, and now may experience two lost production cycles. This presented a barrier to acceptance in some cases. Interestingly when questioned about their existing business continuity arrangements some customers said that they were nervous about the impact of increased short duration interruptions but did not have arrangements in place that reflected their sensitivity to loss of supply.
3. **Managing customer's load** - When negotiating the prospect of a managed agreement with customers, a number had concerns about Electricity North West managing the physical disconnection of their managed load. Some customers have requested an option to be allowed to provide a given demand response within a certain timescale, instead of a pre-defined load control device being tripped automatically. In some instances we are willing to accept this, in particular where, as a last resort, there is a load control device that is controlled by Electricity North West that can be tripped should the customer not provide the agreed demand response in the agreed timescale.

Lesson 4: Analysing the effect of C₂C

Background: A key aspect of the Trial is the technical, economic and environmental assessment of C₂C. Our two academic partners; The University of Strathclyde and The University of Manchester are currently completing this analysis.

The technical work-package is validating the effect of new C₂C network configurations at distribution level and addition of post fault demand response loads on: (i) ability to release network capacity; (ii) electrical losses; and (iii) power quality.

The economic and environmental work-package is investigating how economically favourable the C₂C solution is and also the resultant carbon impact from the assets and the operations of the network under the proposed C₂C configuration.

Lesson Learned:

1. Technical: Analysis of the 36 closely monitored Trial ring networks, indicate that on average a potential doubling of network capacity for open and closed ring C₂C circuits can be achieved compared to the existing radial configuration. At the point where the

network requires reinforcement or the implementation of a C₂C method to accommodate additional demand, the closing of the NOP to implement the closed ring C₂C configuration on average at peak demand will reduce losses by around 10%. When profiling the peak losses up to the capacity limit of the C₂C method, losses are on average greater than the typical reinforced network.

2. Economic: Using the enhanced CBA framework, results of the preliminary analyses conducted for different scenarios and network types indicate that the C₂C method can be a cost effective alternative to traditional reinforcement practices as it can result in significant network investment and social costs reductions. The solution has a higher potential to be economically attractive when: (i) when costly reinforcements can be deferred or averted (ii) social costs are considered (iii) demand growth is highly uncertain.

Lesson 5: Accommodating DSR in ER P2-6

Background: We have conducted a consultation to gather views on the ability of Engineering Recommendation P2/6 (ER P2/6) “Security of Supply” to recognize customer load management and demand side response (collectively termed DSR) and the requirement or otherwise for modification of ER P2/6 in the short term to explicitly include the effects of DSR. In December 2012 Electricity North West was granted derogation from P2/6 relating to the C₂C circuits for the duration of the Trial.

The consultation format included network simulations to develop scenarios to be used in workshops and consultation documents. Internal workshops were initially held with selected staff with varying levels of P2/6 knowledge. The staff were questioned and provided their views on scenarios. A consultation document was then developed as an output from the internal workshop and opened to third parties. External workshops involving other DNOs, IDNOs and NGET took place and attendees gave their view on various scenarios.

Lesson learned:

Our work indicates that there is a general consensus among network operators that P2/6 does not preclude the use of n-1 DSR to maintain compliance but policy changes should be made to make this clearer. Our view is that ETR130 should be changed in the short term to enable DSR to be used at an appropriate level. Our work indicates that there is support for an update to ETR130 to clarify the use of DSR and the management of system intact load levels in the short term. Subsequent to the consultation process we have issued a recommendation report. This report has undergone revision due to further discussions with DNOs regarding the question of whether DSR should be accounted for in Group Demand or Network Capacity. The proposed changes enable each DNO to select the Group Demand option or Network Capacity as long as this selection is justified. The changes are currently under a consultation set up by the GB distribution Code Review Panel which closed on 23 May 2014, and we expect the changes to ETR130 to be ratified by the Distribution Code Review Panel at its September 2014 meeting.

7 BUSINESS CASE UPDATE

We are 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.

Prior to the acceptance of the Project Direction we discussed with Ofgem the re-categorisation of expenditure as our understanding of delivery methods had changed during the development of the Project initiation documentation. For example, we proposed to change our delivery approach by using our own labour for some activities rather than

contractors. We accepted the Project Direction and agreed to inform Ofgem of the proposed changes within the Project Progress Report process. Appendix B details the proposed re-categorisation.

Ofgem has approved this request and agreed that moving forward we should report expenditure in relation to the re-based Project Budget.

Actual spend to date compared to re-based Project Budget is summarised in table 8.1 below. The report includes expenditure up to and including 31 May 2014. Detailed projected expenditure at Project activity level can be found in Appendix C.

Table 8.1

£'000s Excluding Partner Funding Ofgem Cost Category	Spend to date			Total Project		
	Actual	Budget ¹	Variance	Forecast	Budget ¹	Variance
Summary						
Labour	1,248	1,443	195	1,513	1,755	241
Equipment	2,625	3,076	451	2,625	3,078	452
Contractors	2,424	2,908	484	2,926	3,012	85
IT	610	740	129	610	740	129
IPR Costs	0	0	0	0	0	0
Travel & Expenses	0	0	0	0	0	0
Payments to users	156	221	65	240	300	60
Contingency	262	816	554	441	947	505
Decommissioning	0	0	0	0	0	0
Other	265	392	127	384	445	61
Total Costs	7,590	9,596	2,006	8,741	10,275	1,534

Note 1: Re-based Project Budget as agreed by Ofgem on 24 January 2013

The actual spend to date is £7.6m, £2m favourable to Project Budget to date. The estimated at completion costs is forecast to be £8.7m, £1.5m favourable to Project Budget.

The current position shows the most significant contribution to this outperformance to date is due to £0.6m of efficiencies regarding remote control installation (£0.3m of this due to scope reduction²), £0.1m IT efficiencies and £0.6m of efficiencies against contingency. There is also a £0.2m outperformance of the connections design budget. Our estimated at completion forecast currently reflects these efficiencies.

9 BANK ACCOUNT

The Project bank statement is shown in Appendix D. The statement contains all receipts and payments associated with the Project up to the end of May 2014.

10 INTELLECTUAL PROPERTY RIGHTS (IPR)

Electricity North West is following the default IPR arrangements. We have considered our IPR approach to current period Project deliverables and concluded the default IPR arrangements apply.

² The Project Budget assumed the funding for the installation of 540 remote control units, in reality the Project was required to fund the installation of 489 units due to 51 units overlapping with, and being funded by our Quality of Supply investment programme.

11 OTHER

There is no other information at this time that would be of use to Ofgem in understanding the progress of the Project and performance against the SDRC.

12 ACCURACY ASSURANCE STATEMENT

This document has been reviewed by a number of key business stakeholders. The Project team and select members of the C₂C 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 C₂C Project Manager and the Projects' finance representative who review all financial postings to the Project each month in order to ensure 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 Networks Strategy & Technical Support Director.

APPENDIX A –PROJECT BUDGET

£000's	
Excluding Partner Funding	
Ofgem Cost Category	
Labour	2,512
Monitoring Equipment Installation - Labour	22
Business input into specs and testing & CIO System Design Approval	20
Connections – Clerical	65
Connections - Customer Relationship Management	241
Dissemination - ENWL & Customer engagement via email & training	28
Implementation of PowerOn Fusion	709
Maintenance & Support for PowerOn Fusion	187
Project Management - GE	351
Project Management - ENWL	790
Involvement in developing Future Network Planning/Operational Standard	15
Circuit Selection	32
Developing Future Network Planning/Operational Standard	53
Equipment	3,078
Publicity Materials - Informational Pamphlets & postage & packaging	18
Remote Control Installation - Plant	1,954
Monitoring Equipment Installation - Plant	112
Remote Control Installation - Materials	563
Commissioning SCADA link to Remote Control Devices	31
Delivery and configuration of GE IT hardware and software	399
Contractors	2,254
Demand Side Response Customer Survey	391
Project Management - ENWL	115
Remote Control Installation - Labour	844
Remote Control Installation at Customers' Premises	159
Contractors Travel & Publicity - Informing Affected Customers	42
Connections - Connections Design	303
Carbon Analysis	40
Data Analysis and Economic Modelling	185
Power System and Technical Modelling	175
IT	740
Data Capture and Cleanse	55
Database Licenses	100
Develop CRMS Reporting Capability	11
Develop CRMS/PowerOn (SOAP) Interface	87
Develop New Interface to PowerOn Fusion	87
Develop Real-time Data Update Functionality	55
Develop Visual Display Functionality for CRMS	73
Initial Data Load Functionality	55
System Integration & Testing	66
Testing and Development Workstation	10
Upload and Store Estimates (into historian)	85
Upload CRMS Diagram and Managed Loads	55
IPR Costs	0
Travel & Expenses	0
Payments to users	300
Demand Side Response	300
Contingency	947
Development and Preparation	44
Remote Control Installation	284
Publicity, Training and Dissemination	125
DSR and Interruptions	100
Project Management	28
Connections	102
Monitoring Equipment	77
Installation and configuration of IT and Implementation of PowerOn Fusion	109
Circuit selection and data upload	24
Analysis, Modelling and Development of Standards	41
System Integration & Testing	13
Decommissioning	
Other	445
Publicity and Dissemination	257
Accommodation	160
Unplanned interruptions during trial	27
Total	10,275

Source: Ofgem Schedule to Project Direction 19-12-11

APPENDIX B – RE-BASED PROJECT BUDGET (APPROVED 24 JANUARY 2013)

£'000s Excluding Partner Funding Ofgem Cost Category	Total Project			Comments
	Re-based Budget	Budget	Variance	
Labour	1,755	2,512	758	
Monitoring Equipment Installation - Labour	22	22	0	
Business input into specs and testing & CIO System Design Approval	20	20	0	
Connections – Clerical	65	65	0	
Connections - Customer Relationship Management	241	241	0	
Dissemination - ENWL & Customer engagement via email & training	28	28	0	
Implementation of PowerOn Fusion	0	709	709	Moved to Contractor from Labour
Maintenance & Support for PowerOn Fusion	187	187	0	
Project Management - GE	0	351	351	Moved to Contractor from Labour
Project Management - ENWL	790	790	0	
Involvement in developing Future Network Planning/Operational Standard	15	15	0	
Circuit Selection	0	32	32	Contractors used instead of internal labour
Developing Future Network Planning/Operational Standard	0	53	53	Contractors used instead of internal labour
Connections - Connections Design	303	0	(303)	Internal labour to be used instead of contractors
Remote Control Installation	84	0	(84)	10% of Remote Control Installation by internal labour
Equipment	3,078	3,078	0	
Publicity Materials - Informational Pamphlets & postage & packaging	18	18	0	
Remote Control Installation - Plant	1,954	1,954	0	
Monitoring Equipment Installation - Plant	112	112	0	
Remote Control Installation - Materials	563	563	0	
Commissioning SCADA link to Remote Control Devices	31	31	0	
Delivery and configuration of GE IT hardware and software	399	399	0	
Contractors	3,012	2,254	(758)	
Demand Side Response Customer Survey	391	391	0	
Project Management - ENWL	115	115	0	
Remote Control Installation - Labour	760	844	84	10% of original budget moved to Labour
Remote Control Installation at Customers' Premises	159	159	0	
Contractors Travel & Publicity - Informing Affected Customers	42	42	0	
Connections - Connections Design	0	303	303	
Carbon Analysis	40	40	0	
Data Analysis and Economic Modelling	185	185	0	
Power System and Technical Modelling	175	175	0	
Project Management - GE	351	0	(351)	Moved to Contractor from Labour
Circuit Selection	32	0	(32)	Contractors used instead of internal labour
Developing Future Network Planning/Operational Standard	53	0	(53)	Contractors used instead of internal labour
Implementation of PowerOn Fusion	709	0	(709)	Moved to Contractor from Labour
IT	740	740	0	
Data Capture and Cleanse	55	55	0	
Database Licenses	100	100	0	
Develop CRMS Reporting Capability	11	11	0	
Develop CRMS/PowerOn (SOAP) Interface	87	87	0	
Develop New Interface to PowerOn Fusion	87	87	0	
Develop Real-time Data Update Functionality	55	55	0	
Develop Visual Display Functionality for CRMS	73	73	0	
Initial Data Load Functionality	55	55	0	
System Integration & Testing	66	66	0	
Testing and Development Workstation	10	10	0	
Upload and Store Estimates (into historian)	85	85	0	
Upload CRMS Diagram and Managed Loads	55	55	0	
IPR Costs	0	0	0	
Travel & Expenses	0	0	0	
Payments to users	300	300	0	
Demand Side Response	300	300	0	
Contingency	947	947	0	
Development and Preparation	44	44	0	
Remote Control Installation	284	284	0	
Publicity, Training and Dissemination	125	125	0	
DSR and Interruptions	100	100	0	
Project Management	28	28	0	
Connections	102	102	0	
Monitoring Equipment	77	77	0	
Installation and configuration of IT and Implementation of PowerOn Fusion	109	109	0	
Circuit selection and data upload	24	24	0	
Analysis, Modelling and Development of Standards	41	41	0	
System Integration & Testing	13	13	0	
Decommissioning	0	0	0	
Other	445	445	0	
Publicity and Dissemination	257	257	0	
Accommodation	160	160	0	
Unplanned interruptions during trial	27	27	0	
Total	10,275	10,275	0	

Source: Ofgem Schedule to Project Direction 19-12-11

APPENDIX C – DETAILED PROJECT EXPENDITURE

£'000s Excluding Partner Funding Ofgem Cost Category	Forecast	Total Project Re-based Budget	Variance	Comments
Labour	1,513	1,755	241	Estimated at completion costs £241k favourable to plan (Connections efficiencies)
Monitoring Equipment Installation - Labour	54	22	(32)	Higher than expected install unit rate. Manual collection of data & removal of equipment at end of Trial not budgeted.
Business input into specs and testing & CIO System Design Approval	27	20	(7)	Activity completed. Estimated at Completion cost £7k adverse to plan.
Connections – Clerical	62	65	3	
				Lower than anticipated volumes. Estimated at completion cost £83k favourable to plan.
Connections - Customer Relationship Management	157	241	83	
Dissemination - ENWL & Customer engagement via email & training	27	28	1	
Maintenance & Support for PowerOn Fusion	71	187	116	Anticipated efficiency. Estimated at completion £116k favourable to plan.
Project Management - ENWL (Labour)	795	790	(5)	
Involvement in developing Future Network Planning/Operational Standard	15	15	(1)	
				Lower than anticipated volumes. Estimated at completion cost £104k favourable to plan.
Connections - Connections Design (Labour)	199	303	104	
Remote Control Installation - ENWL Labour	106	84	(21)	Resolution of post go live bug fixes. Estimated at Completion £21k adverse to plan. Offset by outperformance of contractor costs.
Equipment	2,625	3,078	452	Estimated at completion costs £452k favourable to plan (Remote control efficiencies)
Publicity Materials - Informational Pamphlets & postage & packaging	17	18	1	
Remote Control Installation - Plant	1,812	1,954	142	Efficiency, estimated at completion £142k favourable to plan.
Monitoring Equipment Installation - Plant	179	112	(68)	Higher than expected equipment unit cost.
Remote Control Installation - Materials	218	563	345	Efficiency, estimated at completion £345 favourable to plan.
Commissioning SCADA link to Remote Control Devices	0	31	31	Efficiency, estimated at completion £31 favourable to plan.
Delivery and configuration of GE IT hardware and software	399	399	0	
Contractors	2,926	3,012	85	Estimated at completion costs £85k favourable to plan (Remote control efficiencies)
Demand Side Response Customer Survey	415	391	(24)	Additional costs for peer review of findings at project closedown
Project Management - ENWL (Contractors)	120	115	(5)	
Remote Control Installation - Labour	630	760	130	Efficiency. Estimated at completion £130k favourable to plan.
Remote Control Installation at Customers' Premises	134	159	25	Profile variance to plan, estimated at completion £25k favourable to plan.
Contractors Travel & Publicity - Informing Affected Customers	37	42	5	Estimated at completion £5k favourable to plan.
Carbon Analysis	42	40	(2)	
Data Analysis and Economic Modelling	201	185	(16)	PB Power support of co-ordination of universities during closedown
Power System and Technical Modelling	191	175	(16)	PB Power support of co-ordination of universities during closedown
Project Management - GE	351	351	0	
Circuit Selection	38	32	(7)	Activity complete. Actual spend £7k adverse to plan.
Developing Future Network Planning/Operational Standard (Contractors)	53	53	0	
Implementation of PowerOn Fusion	714	709	(5)	
IT	610	740	129	Estimated at completion costs £129k favourable to plan (IT licences efficiencies)
Data Capture and Cleanse	54	55	1	
				Efficiency, one licence required at £10k. Estimated at completion cost £91k favourable to plan.
Database Licenses	10	100	91	
Develop CRMS Reporting Capability	10	11	1	Activity completed. In line with plan.
Develop CRMS/PowerOn (SOAP) Interface	81	87	6	Activity completed. £6k favourable to plan.
Develop New Interface to PowerOn Fusion	92	87	(4)	Activity completed. £4k adverse to plan.
Develop Real-time Data Update Functionality	53	55	2	
Develop Visual Display Functionality for CRMS	78	73	(5)	Activity completed. £5k adverse to plan.
Initial Data Load Functionality	88	55	(33)	Activity completed. £33k adverse to plan.
System Integration & Testing	73	66	(7)	Activity completed. £7k adverse to plan.
Testing and Development Workstation	4	10	6	Activity completed. £6k adverse to plan.
Upload and Store Estimates (into historian)	45	85	40	Activity completed. £40k favourable to plan.
Upload CRMS Diagram and Managed Loads	24	55	31	Activity completed. £31k favourable to plan.
IPR Costs	0	0	0	
Travel & Expenses	0	0	0	
Payments to users	240	300	60	Estimated at completion costs £60k favourable to plan
Demand Side Response	240	300	60	Efficiency, estimated at completion £60 favourable to plan
Contingency	441	947	506	Estimated at completion costs £506k favourable to plan (RC & connections efficiencies)
Development and Preparation	14	44	29	Activity completed. £14k of contingency required.
Remote Control Installation	0	284	284	Activity completed. No contingency required.
Publicity, Training and Dissemination	122	125	3	Estimate full use of contingency required.
DSR and Interruptions	4	101	97	
Project Management	24	28	4	Estimate full use of contingency required.
Connections	0	102	102	Current estimate contingency will not be required.
Monitoring Equipment	86	77	(9)	Higher than expected unit rates for labour and equipment.
Installation and configuration of IT and Implementation of PowerOn Fusion	109	109	1	
Circuit selection and data upload	24	24	0	Ongoing data upload and management.
Analysis, Modelling and Development of Standards	42	41	(1)	
System Integration & Testing	16	13	(4)	Activity completed. £4k adverse to plan.
Decommissioning	0	0	0	
Other	384	445	61	Estimated at completion costs £61k favourable to plan (Accommodation efficiencies)
Publicity and Dissemination	290	257	(33)	Higher than expected unit costs of workshops/ seminars and trade articles
Accommodation	67	160	93	Estimated at completion £100k favourable to plan.
Unplanned interruptions during trial	27	27	0	
	8,741	10,275	1,534	

Source: Ofgem Schedule to Project Direct 19-12-11

APPENDIX D – PROJECT BANK ACCOUNT

The bank statement below details all transactions relevant to the Project up to 13 June 2014. This includes all receipts and payments associated with the Project up to the May 2014 month end reporting period.



Lloyds TSB
Statements and Balances

Yesterday's Statement

C082421

ELECTRICITY NWL NO.11 LCNF (GBP)

Date	Type	Narrative	Value Date	Payments	Receipts	Balance
04JAN12		Opening Ledger Balance				0.00 Cr
24APR12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	19,166.67 Cr
25APR12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	136,666.67 Cr
27APR12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00268			1,319,416.63	1,456,083.30 Cr
27APR12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.63	1,515,249.93 Cr
27APR12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.37	1,573,583.30 Cr
27APR12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.37	1,619,416.67 Cr
27APR12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.63	1,678,583.30 Cr
27APR12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.37	1,719,416.67 Cr
27APR12	BGC	R B S-SP DISTRIBUT BGC LOW CARBON NETWORK			27,500.00	1,746,916.67 Cr
27APR12	BGC	R B S-SP MANWEB BGC LOW CARBON NETWORK			39,166.63	1,786,083.30 Cr
08MAY12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00277		372,174.17		1,413,909.13 Cr
24MAY12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	1,433,075.80 Cr
25MAY12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	1,550,575.80 Cr
28MAY12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00285			292,416.67	1,842,992.47 Cr
28MAY12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	1,902,159.14 Cr
28MAY12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	1,960,492.47 Cr
28MAY12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	2,006,325.80 Cr
28MAY12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	2,065,492.47 Cr
28MAY12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	2,106,325.80 Cr
30MAY12	F/FLOW	SP MANWEB PLC F/FLOW			39,166.67	2,145,492.47 Cr
30MAY12	F/FLOW	SP DISTRIBUTION LT F/FLOW			27,500.00	2,172,992.47 Cr
11JUN12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00287		68,669.60		2,104,322.87 Cr
22JUN12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	2,123,489.54 Cr
25JUN12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	2,240,989.54 Cr
28JUN12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00291			292,416.67	2,533,406.21 Cr
28JUN12	F/FLOW	SP DISTRIBUTION LT F/FLOW			27,500.00	2,560,906.21 Cr
28JUN12	F/FLOW	SP MANWEB PLC F/FLOW			39,166.67	2,600,072.88 Cr
28JUN12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	2,659,239.55 Cr
28JUN12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	2,717,572.88 Cr
28JUN12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	2,763,406.21 Cr
28JUN12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	2,822,572.88 Cr
28JUN12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	2,863,406.21 Cr
28JUN12	CHGS	ACCOUNT CHARGE		4.20		2,863,402.01 Cr
09JUL12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00294		455,501.23		2,407,900.78 Cr
09JUL12		Value of Credits (30)			3,304,249.98	
09JUL12		Value of Debits (4)		896,349.20		
09JUL12		Closing Ledger Balance				2,407,900.78 Cr
09JUL12		Closing Cleared Balance				2,407,900.78 Cr

*** End of Report ***

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Page 1

ELECTRICITY NWL NO.11 LCNF (C2C) (GBP)

Date	Type	Narrative	Value Date	Payments	Receipts	Balance
10JUL12		Opening Ledger Balance				2,407,900.78 Cr
24JUL12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	2,427,067.45 Cr
25JUL12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	2,544,567.45 Cr
27JUL12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER.00297			292,416.67	2,836,984.12 Cr
27JUL12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	2,896,150.79 Cr
27JUL12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	2,954,484.12 Cr
27JUL12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	3,000,317.45 Cr
27JUL12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	3,059,484.12 Cr
27JUL12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	3,100,317.45 Cr
27JUL12	BGC	R B S-SP DISTRIBUT BGC LOW CARBON NETWORK			27,500.00	3,127,817.45 Cr
27JUL12	BGC	R B S-SP MANWEB BGC LOW CARBON NETWORK			39,166.67	3,166,984.12 Cr
08AUG12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER.00301		518,517.25		2,648,466.87 Cr
24AUG12	CR	INTEREST ADJUSTMENT GROSS CREDIT INTEREST			1,051.61	2,649,518.48 Cr
24AUG12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	2,668,685.15 Cr
28AUG12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER.00309			292,416.67	2,961,101.82 Cr
28AUG12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	3,078,601.82 Cr
28AUG12	F/FLOW	SP DISTRIBUTION LT F/FLOW			27,500.00	3,106,101.82 Cr
28AUG12	F/FLOW	SP MANWEB PLC F/FLOW			39,166.67	3,145,268.49 Cr
28AUG12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	3,204,435.16 Cr
28AUG12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	3,262,768.49 Cr
28AUG12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	3,308,601.82 Cr
28AUG12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	3,367,768.49 Cr
28AUG12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	3,408,601.82 Cr
11SEP12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER.00317		278,744.88		3,129,856.94 Cr
19SEP12	INT	GROSS CREDIT INTEREST			3,409.65	3,133,266.59 Cr
24SEP12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	3,152,433.26 Cr
25SEP12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	3,269,933.26 Cr
26SEP12	CHGS	ACCOUNT CHARGE		3.11		3,269,930.15 Cr
28SEP12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER.00327			292,416.67	3,562,346.82 Cr
28SEP12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	3,621,513.49 Cr
28SEP12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	3,679,846.82 Cr
28SEP12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	3,725,680.15 Cr
28SEP12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	3,784,846.82 Cr
28SEP12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	3,825,680.15 Cr
28SEP12	BGC	R B S-SP DISTRIBUT BGC LOW CARBON NETWORK			27,500.00	3,853,180.15 Cr
28SEP12	BGC	R B S-SP MANWEB BGC LOW CARBON NETWORK			39,166.67	3,892,346.82 Cr
10OCT12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER.00331		600,425.90		3,291,920.92 Cr
24OCT12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	3,311,087.59 Cr
25OCT12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	3,428,587.59 Cr
25OCT12	BGC	R B S-SP DISTRIBUT BGC LOW CARBON NETWORK			27,500.00	3,456,087.59 Cr
25OCT12	BGC	R B S-SP MANWEB BGC LOW CARBON NETWORK			39,166.67	3,495,254.26 Cr
26OCT12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER.00337			292,416.67	3,787,670.93 Cr
26OCT12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	3,846,837.60 Cr
26OCT12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	3,905,170.93 Cr
26OCT12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	3,951,004.26 Cr
26OCT12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	4,010,170.93 Cr

Version : 3,16,1,510

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 13/06/13 09:52.14
 Page 1

ELECTRICITY NWL NO.11 LCNF (C2C) (GBP)

Date	Type	Narrative	Value Date	Payments	Receipts	Balance
26OCT12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	4,051,004.26 Cr
13NOV12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00343		274,863.81		3,776,140.45 Cr
23NOV12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	3,795,307.12 Cr
26NOV12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	3,912,807.12 Cr
28NOV12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00356			292,416.67	4,205,223.79 Cr
28NOV12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	4,264,390.46 Cr
28NOV12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	4,322,723.79 Cr
28NOV12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	4,368,557.12 Cr
28NOV12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	4,427,723.79 Cr
28NOV12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	4,468,557.12 Cr
28NOV12	BGC	R B S-SP DISTRIBUT BGC LOW CARBON NETWORK			27,500.00	4,496,057.12 Cr
28NOV12	BGC	R B S-SP MANWEB BGC LOW CARBON NETWORK			39,166.67	4,535,223.79 Cr
07DEC12	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00361		869,182.89		3,666,040.90 Cr
19DEC12	INT	GROSS CREDIT INTEREST			4,635.39	3,670,676.29 Cr
21DEC12	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	3,689,842.96 Cr
27DEC12	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	3,807,342.96 Cr
27DEC12	CHGS	ACCOUNT CHARGE		3.20		3,807,339.76 Cr
28DEC12	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00371			292,416.67	4,099,756.43 Cr
28DEC12	F/FLOW	SP MANWEB PLC F/FLOW			39,166.67	4,138,923.10 Cr
28DEC12	F/FLOW	SP DISTRIBUTION LT F/FLOW			27,500.00	4,166,423.10 Cr
28DEC12	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	4,225,589.77 Cr
28DEC12	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	4,283,923.10 Cr
28DEC12	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	4,329,756.43 Cr
28DEC12	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	4,388,923.10 Cr
28DEC12	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	4,429,756.43 Cr
16JAN13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00382		829,445.57		3,600,310.86 Cr
24JAN13	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	3,619,477.53 Cr
25JAN13	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	3,736,977.53 Cr
28JAN13	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00387			292,416.67	4,029,394.20 Cr
28JAN13	F/FLOW	SP DISTRIBUTION LT F/FLOW			27,500.00	4,056,894.20 Cr
28JAN13	F/FLOW	SP MANWEB PLC F/FLOW			39,166.67	4,096,060.87 Cr
28JAN13	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	4,155,227.54 Cr
28JAN13	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	4,213,560.87 Cr
28JAN13	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	4,259,394.20 Cr
28JAN13	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	4,318,560.87 Cr
28JAN13	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	4,359,394.20 Cr
07FEB13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00397		593,252.91		3,766,141.29 Cr
22FEB13	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	3,785,307.96 Cr
25FEB13	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	3,902,807.96 Cr
28FEB13	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00406			292,416.67	4,195,224.63 Cr
28FEB13	BGC	LONDON POWER NETWO BGC LOW CARB NETWORKS			59,166.67	4,254,391.30 Cr
28FEB13	BGC	SOUTH EASTERN POWE BGC LOW CARB NETWORKS			58,333.33	4,312,724.63 Cr
28FEB13	BGC	EASTERN POWER NETW BGC LOW CARB NETWORKS			45,833.33	4,358,557.96 Cr
28FEB13	BGC	NORTHERN ELECTRIC BGC LCNF			59,166.67	4,417,724.63 Cr
28FEB13	BGC	NORTHERN ELECTRIC BGC LCNF			40,833.33	4,458,557.96 Cr
28FEB13	BGC	R B S-SP DISTRIBUT BGC LOW CARBON NETWORK			27,500.00	4,486,057.96 Cr
28FEB13	BGC	R B S-SP MANWEB BGC			39,166.67	4,525,224.63 Cr

ELECTRICITY NWL NO.11 LCNF (C2C) (GBP)

Date	Type	Narrative	Value Date	Pymnts:	Receipts:	Balance
08MAR13		Opening Ledger Balance				4,525,224.63 Cr
08MAR13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00408		512,079.14		4,013,145.49 Cr
20MAR13	INT	GROSS CREDIT INTEREST			4,951.49	4,018,096.98 Cr
22MAR13	F/FLOW	SCOTTISH HYDRO-ELE F/FLOW			19,166.67	4,037,263.65 Cr
25MAR13	F/FLOW	WESTPOWSWEST F/FLOW			117,500.00	4,154,763.65 Cr
26MAR13	CHGS	ACCOUNT CHARGE		3.21		4,154,760.44 Cr
28MAR13	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00416			292,416.67	4,447,177.11 Cr
28MAR13	BGC	LONDON POWER NETWO BGC			59,166.67	4,506,343.78 Cr
28MAR13	BGC	LOW CARB NETWORKS SOUTH EASTERN POWE BGC			58,333.33	4,564,677.11 Cr
28MAR13	BGC	LOW CARB NETWORKS EASTERN POWER NETW BGC			45,833.33	4,610,510.44 Cr
28MAR13	BGC	LOW CARB NETWORKS NORTHERN ELECTRIC BGC			59,166.67	4,669,677.11 Cr
28MAR13	BGC	LCNF NORTHERN ELECTRIC BGC			40,833.33	4,710,510.44 Cr
28MAR13	BGC	LCNF R B S-SP DISTRIBUT BGC			27,500.00	4,738,010.44 Cr
28MAR13	BGC	LOW CARBON NETWORK R B S-SP MANWEB BGC			39,166.67	4,777,177.11 Cr
28MAR13	BGC	LOW CARBON NETWORK				
10APR13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00425		513,672.02		4,263,505.09 Cr
16MAY13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00445		249,902.11		4,013,602.98 Cr
11JUN13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00461		202,350.07		3,811,252.91 Cr
19JUN13	INT	GROSS CREDIT INTEREST			5,324.29	3,816,577.20 Cr
27JUN13	CHGS	ACCOUNT CHARGE		1.87		3,816,575.33 Cr
08JUL13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00476		134,066.60		3,682,508.73 Cr
12AUG13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00494		263,450.99		3,419,057.74 Cr
19SEP13	INT	GROSS CREDIT INTEREST			4,589.85	3,423,647.59 Cr
26SEP13	CHGS	ACCOUNT CHARGE		1.07		3,423,646.52 Cr
30SEP13	CR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00505			49,583.62	3,473,230.14 Cr
10OCT13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00514		60,716.41		3,412,513.73 Cr
13NOV13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00531		110,355.61		3,302,158.12 Cr
06DEC13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00547		105,095.25		3,197,062.87 Cr
06DEC13		Value of Credits (14)			823,532.39	
06DEC13		Value of Debits (12)		2,151,694.35		
06DEC13		Closing Ledger Balance				3,197,062.87 Cr
06DEC13		Closing Cleared Balance				3,197,062.87 Cr

*** End of Report ***

ELECTRICITY NWL NO.11 LCNF (C2C) (GBP)

Date	Type	Narrative	Value Date	Payments	Receipts	Balance
06DEC13		Opening Ledger Balance				3,302,158.12 Cr
06DEC13	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00547		105,095.25		3,197,062.87 Cr
19DEC13	INT	GROSS CREDIT INTEREST			4,218.18	3,201,281.05 Cr
03JAN14	CHGS	CHARGE ADVISED		1.09		3,201,279.96 Cr
16JAN14	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00574		126,064.02		3,075,215.94 Cr
25FEB14	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00595		100,470.77		2,974,745.17 Cr
10MAR14	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00600		160,235.87		2,814,509.30 Cr
19MAR14	INT	GROSS CREDIT INTEREST			3,836.85	2,818,346.15 Cr
31MAR14	CHGS	ACCOUNT CHARGE		1.04		2,818,345.11 Cr
25APR14	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00622		96,232.22		2,722,112.89 Cr
15MAY14	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00630		60,658.48		2,661,454.41 Cr
10JUN14	DR	ELECTRICITY NWL NO.4 PYMT TRANSFER 00648		83,772.52		2,577,681.89 Cr
10JUN14		Value of Credits (2)			8,055.03	
10JUN14		Value of Debits (9)		732,531.26		
10JUN14		Closing Ledger Balance				2,577,681.89 Cr
10JUN14		Closing Cleared Balance				2,577,681.89 Cr

*** End of Report ***