

I²EV (My Electric Avenue)

4th Project Six Monthly Progress Report

Project Number	SSET205
DNO	Southern Electric Power Distribution Ltd
Project Lead	EA Technology
Reporting Period	July 2014 – November 2014

Author: EA Technology
Date: 12th December 2014
Version: 1.2

The 'My Electric Avenue' project is the public identity for the Low Carbon Network (LCN) Fund Tier 2 project "I²EV". The formal title "I²EV" is used for contractual and Ofgem reporting purpose.

Project leads



Project partners



My Electric Avenue has received support from Ofgem through the Low Carbon Networks (LCN) Fund.

Version History

Date	Version	Author/s	Notes	Reference documents
17/11/2014	0.1 – 0.6	TB / BL / ES		Customer Engagement Plan Project Risk Register Project Direction
17/11/2014	0.7	TB	Draft document for initial review by SSEPD.	
26/11/2014	0.8	TB	Incorporation of SSEPD's comments.	
08/12/2014	0.9	TB	Incorporation of SSEPD's comments.	
09/12/2014	1.1	TB	Issued to SSEPD.	

Final Approval

Date	Version	EA Technology authorisation by:	SSEPD authorisation by:
12/12/2014	1.2	Dave A Roberts (Project Director)	Alan Broadbent

DISCLAIMER: Care has been taken in the preparation of this Report, but all advice, analysis, calculations, information, forecasts and recommendations are supplied for the assistance of the relevant client and are not to be relied on as authoritative or as in substitution for the exercise of judgement by that client or any other reader. EA Technology Ltd nor any of its personnel engaged in the preparation of this Report shall have any liability whatsoever for any direct or consequential loss arising from use of this Report or its contents and give no warranty or representation (express or implied) as to the quality or fitness for the purpose of any process, material, product or system referred to in the report.

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means electronic, mechanical, photocopied, recorded or otherwise, or stored in any retrieval system of any nature without the written permission of the copyright holder.

© EA Technology Ltd

EA Technology Limited, Capenhurst Technology Park, Capenhurst, Chester, CH1 6ES; Tel: 0151 339 4181
Fax: 0151 347 2404

<http://www.eatechnology.com>

Registered in England number 2566313

Executive summary

This project was submitted to Ofgem's Tier 2 Low Carbon Networks (LCN) Fund as Innovation Squared: Electric Vehicles "I²EV" but was rebranded early in 2013 to improve public acceptance to 'My Electric Avenue.' The project is led by EA Technology, with project partners Scottish and Southern Energy Power Distribution Limited (SSEPD) (the host Distribution Network Operator), Nissan (EV supplier), Fleetdrive Electric (electric vehicle rental programme management), and Zero Carbon Futures (charging point network developer), and Northern Powergrid (collaborating DNO). In addition there are two academic institutions supporting the project, the University of Manchester (providing network modelling and analysis), and De Montfort University (providing socio-economic data gathering and analysis). Ricardo is independently verifying the project.

Further details available on the project website at www.myelectricavenue.info.

This report details progress of the project towards the end deliverables in the reporting period June 2014 – November 2014.

Progress

The project has made significant progress towards delivering the target learning outcomes over the last reporting period, delivering vehicles and re-deploying equipment across all technical clusters.

The project has delivered all cars to our technical trial participants and has installed all required technology at participant properties. We continue to generate substantial data sets from both the Monitor Controllers¹ (MCs) installed in the technical clusters and the 200+ electric vehicles (EVs) provided to our technical and social trial participants. Analysis has begun on the data available from the MCs in each cluster and the CARWINGS system, generating learning earlier than was anticipated.

The MC for the Lyndhurst cluster will be scheduled for installation immediately after a required update to the system software has been implemented. The specific risk assessment for deploying the equipment on an overhead line (OHL) network has been approved and will form part of the documentation and learning generated by the project.

The analysis efforts of project partners has been greatly assisted through the development of a bespoke database allowing the data from the on-site equipment to be directly compared with the vehicle outputs.

A deliverable pertaining to the anticipated switch-off frequency on the trial networks has been issued, including details on how the thresholds for triggering curtailment of EV charging has been determined.

Progress has continued on schedule against The University of Manchester's modelling deliverables, with the third due for delivery in December 2014.

Work on SDRCs due later in the project, (late 2015) has been started where possible, including instigating dialogue with charging point manufacturers in relation to the integration and impact of Esprit on their product range.

¹ The MC is the part of Esprit located in the distribution substation, used to measure the feeder current and issue control instructions.

Key Issues

The Mark 2 Intelligent Control Boxes² (ICBs) were successfully redeployed and commissioned across all clusters by early October 2014. This was followed by switching events being recorded in parallel with a gradual degradation of communications reliability across the Power Line Carrier (PLC) network in the cluster. Investigations have identified that excessive communication traffic from the MC whilst initialising control of the ICBs is interfering with 'heartbeat communications' necessary to maintain a stable PLC network.

Work is currently underway to implement an update to the MC functionality to prevent the two types of communication from causing interference. Initial timescales indicate roll-out of the upgrade across the clusters in December 2014.

It is acknowledged that for clusters where communication with ICBs is intermittent there is a risk of loss of data. However, it is emphasised that supportive information on charging is being collected by the Nissan CARWINGS system 95% of participating vehicles.

Key Risks – Closed

A number of risks have been closed during the period since the previous progress report and with the key ones detailed in section 3.

The risk relating to customer recruitment has been closed due to sufficient participants signing contractual agreements for both the technical and social trials in line with the Project Direction. The project was provided with up to 250 vehicles by Nissan for use within the project and 30 of these remain available with in excess of 100 interested parties. All remaining vehicles that are leased under the MEA project will provide the project with additional data for bolstering the statistical validity of the social trial of future learning and conclusions.

The installation of repeater cabinets for the South Shields cluster was delayed in the previous reporting period due to the objection by non-project participants. This has now been resolved through the installation of a buried chamber for the repeaters replacing the originally planned cabinet.

Procurement of equipment for the project covered three areas, each of which has been resolved.

- All charging points required for the project have been installed with their associated ICBs
- ICBs have been installed at properties for all technical trial participants
- Electric Vehicles have been delivered to all current (109) technical and 110 of the social trial participants.

No further instances of the incorrect installation of ICBs have been experienced.

An identified fault with the ICBs has been rectified and upgraded replacement units have been re-deployed to all technical trial participants.

Key Risks – Ongoing

The key on-going risk to the project relates to establishing and maintaining stable communications between the MC and ICBs. After extensive investigation, this has proven to be linked to the

² The ICB is the part of Esprit located at the end-customer's property, these receive signals from the ICB and break charging to vehicles if network demand breaches predefined limits.

functionality of the Esprit algorithm control signals in the MC interfering with 'handshake signals' the PLC network utilises to establish and maintain connections between devices. A software upgrade to resolve this is planned for deployment in early December 2014.

Learning

The key project learning outcomes for this reporting period cover a wide range of areas:

- Improvements to installation planning to ensure contractors understand the rationale behind specific instructions and provide the necessary evidence of a suitable installation.
- ICB network data demonstrating the ability of the technology (including PLC) to operate on the LV networks.
- Evidence of the Esprit equipment functioning on the LV networks and the associated impacts of the charging on network voltages.
- Probable EV network loading based on charging data from trial participants.
- Anticipated switching of the EVs based on charging likelihood in comparison to network load.
- Monitoring of networks and combining data storage of disparate data sources to improve later analysis.
- Customer engagement has been proved to last longer, and require greater levels of staff input than expected.

Further details relating to the above learning points are detailed in section 5.

Contents

Executive summary.....	3
Contents	6
Table of Tables.....	6
1 Project manager’s report.....	7
2 Consistency with full submission.....	12
3 Risk & Issue Management	13
4 Successful delivery reward criteria (SDRC)	16
5 Learning Outcomes.....	18
6 Business case update.....	30
7 Progress against budget	31
8 Bank account	35
9 Intellectual Property Rights (IPR).....	35
10 Other	35
11 Accuracy assurance statement.....	36

Table of Tables

Table 1-1 : Technical trial clusters submitted to Ofgem and in progress of establishment.....	11
Table 1-2: Social trial recruitment status	12
Table 3-1: Snapshot of key risks: summary and status	13
Table 3-2: Equipment Issues - Installation of repeater cabinets.....	15
Table 4-1: SDRC Overview	16
Table 5-1: External Dissemination.....	28
Table 7-1: Current expenditure against project category	31
Table 7-2: Cumulative Project Expenditure – October 2014.....	33
Table 7-3: Forecast Cost At Completion.....	34

1 Project manager's report

The My Electric Avenue Project has achieved a number of key milestones in the period following submission of the previous Project Progress Report. Most notably:

- ICBs have been successfully re-deployed in all clusters;
- Commissioning of the Esprit network through Power Line Communication (PLC) methods was successful at all sites³;
- Delivery of vehicles to all Technical Trial participants has been completed;
- The recruitment of additional social trial participants has continued to make use of vehicles provided to the project by Nissan;
- Switching of the charging points by the Esprit system has been recorded in a number of instances;
- Data is being collected from the Nissan CARWINGS system and combined with data recorded from the LV network equipment;
- A number of risks / issues identified in the previous progress report have been closed.

Following successful commissioning, the Esprit test equipment began to experience difficulties in maintaining communication within the PLC network, with some cluster's communication degrading entirely over a period of several days of operation. The cause of this has been identified and a software update to prevent a re-occurrence is currently under development and scheduled for deployment in early December 2014.

1.1 Technical trial progress (installation and operation)

1.1.1 Vehicle deliveries

As of 12th December, all 109 Technical trial vehicles have been completed. To date, 110 – Social trial vehicles have been delivered.

Remaining vehicles made available to the project by Nissan are awaiting allocation following renewed lease contract negotiations with Fleetdrive Electric. There are 37 customers actively interested and have been sent lease documentation in the 30 remaining vehicles. New applications continue to come through the website; in November alone there have been 15 registrations of interest. As such the project is confident that these vehicles will be leased quickly following contract finalisation.

1.1.2 Equipment installations

Substation located equipment: In total, at time of writing nine clusters have a Monitor Controller (MC) installed as part of the Technical trials. The exception is the Lyndhurst cluster, (refer to 1.1.6) and Slough Borough Council (refer to 1.2). Following re-allocation of Slough Borough Council's participation from a full 'Technical' cluster to instead be utilised as a 'virtual Technical cluster', there was no longer a requirement for the installation of equipment.

³ Except for Lyndhurst where the Monitor Controller (MC) is yet to be installed due to the specific challenges inherent with installation on Overhead Line (OHL) Networks; refer to section 1.1.6 for more information.

Seasonal analysis has been undertaken to update the original phase current limits set on each MC for the summer period. The most recent analysis has established phase current limits for the winter period and monitoring of network loads in relation to the thresholds will be undertaken throughout the winter period to ensure the thresholds continue to be suitable.

Customer located equipment: All participating Technical trial clusters (ten in total) have had Intelligent Control Boxes (ICBs) re-installed. The ICBs originally installed earlier this year (Mark 1), have been redesigned, independently verified and re-manufactured. All Mark 1 ICBs were replaced by Mark 2 equivalents by 3 October 2014.

To date, there have been two instances of faulty charging point equipment where repairs have been required. These repairs have been implemented under regular equipment warranty provision.

1.1.3 ICBs

Following successful re-deployment and commissioning of the Mark 2 ICBs, communications have been intermittent and variable across several clusters. Initial data indicates that where ICBs were communicating with the MC, and set a sufficiently low threshold, switching did occur. This provides assurance that Esprit is operating, but as it is dependent upon communications with ICBs is not operating over a sustained period.

This does not pose a risk to the trial networks as detailed in section 1.4.2.

1.1.4 Retrieving data from the Nissan LEAFs

The project is making use of data gathered from participating EVs over the duration of the trial, supplied via Nissan's CARWINGS service. To provide this data, the CARWINGS account must be activated and the customer must press a button each time they drive the vehicle. Frequent reminders to continue 'pressing the blue button' are provided to all participants via project bulletins. Initial data analyses suggests compliance with our requests is high, providing the project with a rich data set on EV usage and charging habits, wherever our participants charge their EV.

In the last reporting period EA Technology have taken greater responsibility in ensuring CARWINGS accounts are registered. Various methods of communication have been used to collect information and verify data, including;

- Online survey;
- Group reminder emails;
- Project-related bulletins;
- Individual emails;
- Individual phone conversations.

A step-by-step guide to registration has been produced, including relevant links to websites, screen shots of online forms and photos of in-car displays to help guide participants to completing registration. In a number of cases, calls were conducted to assist participants in completing the required registration steps during the call.

Data collected from participants, both anecdotally and by survey, has been compared to active CARWINGS download information; highlighting certain Vehicle Identification Numbers (VINs) for which we are unable to download the charging and usage information.

Through closer involvement in CARWINGS verification, it has been identified that a minority of My Electric Avenue participants have been affected by a Europe-wide data transfer error experienced by Nissan (for more details please see referenced memo and CARWINGS report).

- Of 221 Nissan LEAFs delivered to My Electric Avenue Participants, as of the latest download on 10 November, the data from 209 vehicles is being received. Of the remaining 12 vehicles

excluded from downloads, nine were delivered between September and November 2014; three are subject to Europe-wide data transfer error within Nissan.

Data collected for customers has been bolstered in the last reporting period as additional data fields have been provided, including odometer readings for each participant's vehicle.

1.1.5 Network operation

The project is storing measured feeder cable currents of all established clusters (except Lyndhurst) using Nortech's iHost system, enabling download and analysis.

The threshold settings for triggering curtailment of EV charging have been defined utilising a standard approach across all clusters, ensuring that despite each network's load being different, the Esprit system is expected to function in the same manner at all locations. This will ensure, as far as possible, that the experience of all customers is broadly the same with respect to the curtailment of charging, with differences resulting from their use of the vehicle and charging point.

The thresholds are defined with the intention of curtailing EV charging between 1800 and 2200 each day, and will be refined as network load increases and decreases over the remainder of the project. This approach allows us to test the system in a fully operational state throughout the year rather than curtailment being confined to peak winter periods.

1.1.6 Method statements

Only one pole-mounted installation of a monitor-controller is required in SSEPD's license area at the Lyndhurst cluster. Specific Method Statements have been agreed with SSEPD staff, and although an installation date had been set, it was since identified that the monitor controller software requires a software update which cannot be made remotely. As such, the installation has been delayed temporarily until the upgrade has been implemented.

1.1.7 Data monitoring

A central database has been developed in the last reporting period specifically for collating and recording data from iHost (feeder currents and ICB data) and from CARWINGS downloads to maximise potential learning. This database is stored on EA Technology servers and as such has been developed in line with the Project's Data Protection Strategy.

Verification of the iHost data received to date is continuing, using key variables associated with Esprit functioning; switching EV charging.

This database has enabled closer analysis of data collected from CARWINGS and the MCs. As such, the project has identified and implemented improvements to data capture and a new download system to boost reliability of data transferred. Whilst initial iHost and CARWINGS data are largely comparable, the database has identified instances of unexpected CARWINGS data; testing has been implemented to improve understanding.

Combining data from separate sources pertaining to the same event is not a straightforward task. In the case of the MEA project, charging events are recorded through the data gathered by the MC and ICBs in the cluster and the vehicles on-board computer, relayed via Nissan's CARWINGS system. It has been necessary to generate a bespoke database that will enable comparison of the data and facilitate the goals of the project.

1.1.8 Social surveys

To date, the total numbers of participants, including 'additional drivers' taking part in surveys are:

- Technical Participants - 114
- Social Participants – 109

Pre-Trial questionnaires have been issued and completed for both Technical Trial and Social Trial participants. Six Social Trial participants have been excluded from the surveys because they received delivery of their vehicle either on the same day, or before a pre-trial survey was issued. However, as the Social Trial has exceeded recruitment targets, the project is still able to collect over 100 pre-trial questionnaire responses from Social trial participants.

Second questionnaires have been issued to Technical trial participants. In total 109 Technical Trial participants and 'additional drivers' have completed these; there are now three outstanding surveys in Lyndhurst.

Although the recruitment for the remaining Social Trial spaces is still underway, De Montfort University will not be issuing any further surveys to Social trial participants recruited after October 2014. CARWINGS data will still be collected from these participants.

There are more Technical and Social trial surveys being undertaken than vehicles; in some cases second drivers have volunteered to provide input to the project, further increasing the learning to be gained.

De Montfort University have conducted face-to-face individual interviews with Technical trial participants in Wylam (May 2014) and Chineham (September 2014). Further planning for qualitative research has been postponed until Esprit is actively controlling and curtailing charge on a regular basis.

1.2 Technical trial attrition

Attrition, whilst expected given the number of participants and duration of the trials has remained low and will provide valuable insight into the anticipated drop-out rates of future projects.

Three participants (Whiteley, South Gosforth and Your Homes Newcastle) have moved home or job in this period and as such have left the trials. The project has not sought to replace these.

Soon after submission of the previous Project Progress Report, the project team was made aware that Slough Borough Council was due to undergo a significant office renovation over an 18 month period. As part of these renovation works, several members of the 'cluster' were in the process of relocating to other nearby council offices. In addition, Slough Borough Council was unable to confirm the remaining participants would not also be affected. This introduced significant doubt that the cluster participants would charge predominantly at the charging points planned for installation and hence reduced the viability of learning likely to be gained from this cluster.

In order to justify use of project funds on acquisition and installation of charging infrastructure at Slough Borough Council, the project required confidence that the technology would be cycled on a number of occasions. To ensure this would be met, the project requested Slough Borough Council to ensure the chargers controlled by our technology would be used, and an agreement to underwrite the costs of charging equipment should monitored data indicate that the technology was not being cycled as often as is required.

Unfortunately, Slough Borough Council were unable to provide assurance that the conditions for use of project funds would be met and as such, no further project related funds were allocated to this cluster for the provision of equipment in the form of charging points or Esprit equipment.

However, the project believed that learning could still be gained from the Slough Borough Council participants through operation as a 'virtual' cluster, supported by the knowledge that all participants

work for the same organisation, with some degree of commonality in office hours, likely journeys, etc. Telematics data provided by the vehicles (via CARWINGS) will be used in conjunction with computational modelling of the electricity network, and inputs from other clusters, to synthesize how charging might have been controlled had it occurred at the originally intended offices.

Some fluctuation in cluster composition over the course of the project is to be expected as participants' personal circumstances may change over time; these changes are not within the control of the project. Although the project's contracts with these customers are binding, the project team did not deem it appropriate for an LCN Fund project to penalise volunteer participants, in addition to the clauses already enforced through their vehicle lease contract, for a decision to withdraw. As such, customers will be subjected to the normal penalty procedures for withdrawing from the lease contract but no further penalty will be applied.

Table 1-1 : Technical trial clusters submitted to Ofgem and in progress of establishment

Cluster	Submitted Cluster size	Date Established	Current Cluster Size	Date of alteration	Reason
Chiswick	8	27/09/2013	8		
South Gosforth	10	27/09/2013	9	12/08/2014	Moved home
Wylam	10	27/09/2013	10		
Marlow	9	30/09/2013	9		
South Shields	11	14/10/2013	11		
Chineham	10	11/11/2013	10		
Whiteley	11	13/11/2013	10	11/07/2014	Moving home and job
Your Homes Newcastle	13	06/02/2014	12	09/10/2014	Moved jobs
South Shields 2	12	20/02/2014	12		
Lyndhurst	7	04/03/2014	7		
Slough Borough Council	10	05/03/2014	10		

1.3 Social Trial Recruitment Progress

The project has met and exceeded recruitment targets for the Social trials. Both final reports for SDRC 9.5.3 and 9.5.2 were submitted in August 2014 (6 August, and 27 August 2014).

To date, 110 Social Participants have signed contracts to participate in the trials; 100 signed contracts were required by 31 August 2014.

Recruitment is still underway to exceed recruitment targets to ensure that all vehicles provided by Nissan to the project are fully utilised. There are 30 vehicles yet to be leased from the original provision of 250. This will provide additional usage and charging data to the project at no further cost to the project.

Agreements for vehicle lease contracts expire on a quarterly basis. As such the Social trial contract offered to participants prior to September has expired. Fleetdrive Electric and Nissan are currently finalizing the new finance contract for the remaining 30 vehicles.

Table 1-2: Social trial recruitment status

Social trial EOI	Social trial Ordered	Social trial credit check passed	Social trial deliveries
1,530	110	110	110

To date one social trial participant has withdrawn from the project. Following an incident in her vehicle earlier this year she has withdrawn from the trial due to medical reasons.

It should be noted that due to the timing of this, the project is unable to replace this participant with regards to the socio-economic analysis conducted by De Montfort University.

1.4 Key issues

1.4.1 ICB communications

After re-deployment and commissioning of the ICBs, it was found that communications within the PLC network deteriorated when the MC began implementing curtailment of EV charging. Investigations have identified that excessive communication traffic from the MC whilst attempting to control ICBs is interfering with ‘heartbeat communications’ necessary to maintain a stable PLC network.

Work is currently underway to implement an update to the MC functionality to improve communications reliability. Initial timescales indicate roll-out of the upgrade across the clusters in December 2014.

It is acknowledged that for clusters where communication with ICBs is intermittent there is a danger of loss of data. However, it is emphasised that supportive information on charging is being collected by the Nissan CARWINGS system for the majority of participating vehicles.

1.4.2 Controlled charging in Chiswick (due to network constraints) before winter peak

Typical phase currents on each feeder across all monitored clusters were analysed in relation to network capacity and the latest available charging data. This analysis was conducted to determine the probability of network overload as a result of un-curtailed EV charging.

This analysis concluded that the EV charging experienced on the clusters is unlikely to cause the cluster networks any difficulties even in the event of a network load situation exceeding any experienced in the project to date.

However, as the network at Chiswick has the lowest level of additional capacity beyond the maximum recorded load throughout the project, this network will be the first to receive the tested software update detailed in section 1.4.1 above.

As an extra measure, automated SMS alarms have been linked to the 24/7 monitoring and will be sent to key members of the project team if loadings approach cable ratings over the winter period.

2 Consistency with full submission

The project is consistent with the full submission and we remain confident the project will deliver on the intended learning outcomes.

2.1 Change request

The project submitted a Change Request on 26 September and received confirmation of receipt on 3 October 2014. A first batch of queries was returned from Ofgem on 2nd December 2014; the project team is currently seeking a meeting / teleconference to discuss the points raised.

3 Risk & Issue Management

A risk register was developed for the project at the bid stage. This document has since been adopted by the delivery team as a key management tool for the project, and expanded to reflect changes in risks or mitigation as they occur.

In this section of the progress report, we purposely do not discuss all risks in the risk register, instead focusing on those of key significance to the project although the full risk register is provided in Appendix A. Both the significant open and closed risks within this reporting period, listed below in Table 3-1.

Table 3-1: Snapshot of key risks: summary and status

	Risk summary	Status
3.1.1	Recruitment risks	Closed
3.1.2	Data Analysis	Open
3.2	Procurement risks	Closed
3.2.1	Trial equipment – charging points	Closed
3.2	Trial equipment – ICBs	Closed
3.2.3	Electric Vehicles	Closed
3.3	Equipment issues	Open
3.3.1	Incorrect installation of ICBs	Closed
3.3.2	ICB faults	Closed
3.3	Installation of cabinets for repeaters	Closed
3.3.4	Operation of control functionality	Open
3.5	Communications	Open
3.5.1	iHost data collection – monitor controller	Closed
3.5.2	Data collection – ICBs	Open

3.1 Social trials

3.1.1 Recruitment risks

The recruitment of the minimum number of required social trial participants was completed within the June 2014 – December 2014 reporting period, hence the closure of this risk.

Confirmation of the successful recruitment of the social trial participants was confirmed to Ofgem via SSEPD in the submission of SRDC 9.5.3 on 6 August 2014.

Nissan made 250 Leaf Accenta's available to the MEA project and recruitment for the social trials is continuing in order to make use of these if possible. This will provide additional technical data on EV

usage for the project and the wider industrial community and will strengthen the statistical significance of some of our learning.

3.1.2 Data analysis

Delays to deployment of the technology have resulted in adaptations to the planned approach for collection of data relating to the social elements of the project. Specifically, interviews and focus groups to ascertain the impact of the Esprit technology on the use of the vehicles after a period of unconstrained charging have not yet been implemented.

There is a risk to the undertaking of interviews and focus-groups later than initially planned due to resourcing constraints in De Montfort University. Discussions are underway to reschedule the sessions around available resourcing to ensure the targeted learning is still achieved.

3.2 Procurement Risks

3.2.1 Trial Equipment – Charging Points

All charging points (both domestic and business) required for the project, have been installed enabling closure of this risk.

3.2.2 Trial Equipment – ICBs

Slough Borough Council was, following submission of the June 2014 Project Progress Report, removed from the technical clusters as a consequence of significant planned site-works that would have adversely impacted the project learning. The ICBs ordered for the cluster were utilised to accelerate redeployment of cluster equipment and provided additional spares in the event of future equipment failure. This risk has therefore been closed.

3.2.3 Electric Vehicles

The remaining unallocated EVs that will be leased to Social Trial Participants to maximise technical data gained as part of the project require a lease contract to be agreed with Nissan. Nissan's leasing arrangements are revised quarterly as market fluctuations affect prices; delays internally have prevented rapid sign-up of participants to the social trials.

For the purposes of the project, this risk is considered closed as any further social trial participants will provide additional data and learning, beyond that stipulated in the Project Direction.

3.3 Equipment Issues

3.3.1 Incorrect installation of ICBs

Investigation into unforeseen communication problems identified that some ICBs had not been wired in accordance with the installation instructions. Whilst this incorrect wiring was not a safety concern it would have prevented the correct operation of the affected ICB units. On identification of the problem, the installer investigated every potentially affected unit and corrected the wiring where necessary. This risk has now been closed as all clusters have been successfully re-commissioned.

3.3.2 ICB Faults

One ICB developed a fault and was disconnected and removed for failure analysis purposes.

Following investigation, it was decided to recall all ICBs, replacing them with new (Mark 2) devices with the fault corrected. There will be no impact on the learning because of this product recall as the MCs are continuing to gather data regarding the usage of the LV feeder and charging data of the individual EVs is available from the Nissan CARWINGS system.

ICBs were re-installed before the end of October and therefore this risk is now considered closed.

3.3.3 Installation of cabinets for repeaters

During the planned installation of a repeater cabinet in South Shields 1, two residents who are not participating in the trials approached Northern Powergrid personnel. These residents objected strongly to the installation of a cabinet to house repeaters above ground in front of their neighbour’s property. This objection was aggressive and as a result, Northern Powergrid personnel were unable to complete the installation.

The necessary repeater units have now been installed underground in South Shields and this risk is considered closed.

3.3.4 Operation of control functionality within the Monitor Controller

Table 3-2: Equipment Issues - Installation of repeater cabinets

Risk	Esprit system fails to operate as expected.
Likelihood	Certain. Following re-deployment and commissioning of the equipment, the communication networks established in each cluster were found to fail within a few days. The cause of this issue has been identified as a conflict between the routine operation of the Power Line Communications (PLC) system and the implementation of the algorithm. Switching of ICBs has been recorded within clusters prior to the decline of communications
Consequence	Medium. The PLC network within each cluster fails with ICBs sequentially losing communications over a period of two – three days once the MC begins active control of the load on the network. Investigations suggest the control signals being transmitted by the MC are blocking transmission of the PLC network ‘heartbeat’ signals that maintain the communication network.
Mitigation	The software on the MC that controls the implementation of the Esprit algorithm is being refined to ensure there is no conflict between signals required for network load control and those needed for maintaining stable network operation. Until this update is complete, the project will continue to place a greater emphasis on the data provided through the CARWINGS system.

It is noted that the learning generated from the operation of the control functionality is not season dependent as the devices are not being used on parts of the network that are currently experiencing constraints, the constraints managed by the devices will be simulated through the use of cluster specific threshold settings.

3.4 Communications

3.4.1 iHost Data Collection – Monitor Controller

The project has experienced minor issues with the interface between the monitor controller and the central database (iHost). The issues were caused by intermittent GPRS links and teething problems with the interface.

The interface communication protocols have been refined by Nortech, (provider of the iHost central database) and communication reliability has significantly increased. As such this risk is considered closed.

3.4.2 Data Collection – ICBs

During the period of ICBs being bypassed, the project relied on vehicle charging data from Nissan’s CARWINGS system and this data collection will be maintained throughout the project. The cause of the remaining communication issues has been pinpointed as a conflict between required PLC network traffic and Esprit control signals; refer to 3.3.4 for further details.

This risk remains open until the communications are confirmed to be functional.

4 Successful delivery reward criteria (SDRC)

4.1 SDRC Overview

The below table details the status of each SDRC outlined in the Project Direction document; additional information regarding completed and in-progress SDRCs is given below.

Please note that all SDRCs that are currently flagged as ‘Not Started’ were not planned on being underway at this point in the project and so should be considered as on-schedule.

Table 4-1: SDRC Overview

SDRC		Due	Description	Status
9.1	9.1.1	28/02/2013	The provision of a report outlining key areas of learning in the identified areas, with recommendations. The reports will be written such that they can be published in the public domain for an audience of: DNOs, Ofgem or other interested third parties who may wish to lead a LCN Fund project in collaboration with a DNO.	Complete
9.2	9.2.1	30/04/2013	Make available the initial contract template used between SEPD and EA Technology together with supporting guidance of the thinking behind key clauses. This will be made available to Ofgem and other DNOs as a starting point for use in future projects.	Complete
	9.2.2	31/10/2015	Review of the contract put in place between SEPD and EA Technology. A review of the initial contract developed in 9.2.1 focussing on what worked well, what didn't work well, and what should be done differently in the future.	In progress
	9.2.3	31/12/2015	An updated contract template taking into account learning from SDRC 9.2.2.	Not started
9.3	9.3.1	31/10/2015	Report detailing processes established and utilised throughout the project including templates of any forms (e.g. work orders for SSEP staff) and records of meetings/regular communications created as part of the process. This will include an evaluation of the collaboration between SSEPD and Northern Powergrid with a 3rd party interface.	In progress
	9.3.2	31/10/2015	A framework to enable update suggestions to SSEPD policies and/or procedures, identified during the course of the project will be provided, (e.g. A procedure detailing the necessary steps when considering a customer's request for an EV charging point).	Not started
	9.3.3	31/10/2015	An assessment from the participating DNO of the level of effort	In progress

SDRC		Due	Description	Status
			expended on Project Management of the I ² EV task by the staff involved in comparison to previous innovation projects.	
9.4	9.4.1	31/07/2013	The provision of 6 monthly independent reviews of the project and technology with specific inclusion of improvements and adaptations to working practices incorporated by the project team following the previous independent review.	Complete
		31/01/2014		Complete
		31/07/2014		Complete
		31/01/2015	a) Produce six monthly reports (highlighting strengths and improvement areas) to be tabled at steering group meetings. b) Produce response to six monthly report, detailing improvements planned by Project Steering Group, because of the review.	In progress
		31/07/2015		Not started
		31/12/2015		Not started
9.5	9.5.0	28/02/2013	Customer engagement: Submission of customer engagement plan and data protection strategy for Authority approval (1 Feb 2013).	Complete
	9.5.1	30/09/2013	Sign up of 3 cluster groups.	Complete
		31/12/2013	Sign up of 5 cluster groups.	Complete
		31/03/2014	Sign up of 100 customers in at least 7 cluster groups.	Complete
		31/08/2014	Sign up of 10 cluster groups.	Complete
	9.5.2	31/08/2014	All cluster funding allocated due to successful establishment of clusters.	Complete
	9.5.3	31/08/2014	Social trials: Minimum of 100 EV drivers signed up to have their driving habits recorded (month 18 following CEP, August 2014). a) Reports presented to the monthly project meetings to capture and log progress in signing up customers to the EV trials. b) Six monthly reports to steering group on trial engagement progress.	Complete
9.6	9.6.1	31/10/2015	A report documenting the finding from the socio-economic analysis on public reaction to the technology.	Not started
9.7	9.7.1	30/06/2015	Documentation describing: a) Views of the OEM community of the impact (if any) that cycling of EVs (or HPs) may have on their product(s) and end of life b) Recommendations of suitable cycle times for EVs (and possibly Heat Pumps) for demand-side response c) Evidence of whether this solution would be feasible or not combining learning from SDRC 9.5 and SDRC 9.6.	In Progress
9.8	9.8.1	31/11/2015	Modelling to understand additional headroom available / other network benefits from using the Technology. a) The models will assess the percentage of thermal and voltage headroom estimates produced. b) The project will deliver an updated Solution template(s) specific to the Technology, and any updated EV charging profiles for use in the GB Smart Grid Forum modelling.	In Progress
	9.8.2	31/11/2015	Potential cost savings and carbon emission savings using DECC published carbon intensity figures. If technology is unsuccessful, reasons why will be stated.	Not started

5 Learning Outcomes

5.1 Commercial

5.1.1 Customer Engagement

Managing customer expectations: Despite volunteering to participate in a trial, most participants perceive the project as providing them with a service and expect a response to their questions or issues as they would from any other company. It is therefore essential that future trials recognise this expectation and ensure there is sufficient resource (budget, organisational alignment and time) to meet customer expectations.

By way of example, on occasion, it was found that due to other business commitments SSEC were unable to attend customer premises in timescales that were expected by the participant⁴. For the remainder of the project, ZCF have chosen to include ELM EV as an additional contractor that could be utilised for maintenance / support to customers due to SSEC's resource coverage and availability in 'emergency' cases. This will enable ZCF to reliably provide customer support in short timescales if required, allowing for necessary flexibility with customer's schedules.

5.2 Technical

5.2.1 Installations

Holding a practice installation with contractors is useful to highlight equipment required on site during installation which had not already been identified.

Closer resource management within sub-contractors can be hugely beneficial in quality control. Making use of the same team as far as possible ensures a degree of consistency across installations and avoids the need for repetitive 'tool box talks' or duplicated training.

Enforcing payment restrictions based on evidence of safe, quality installation (payment withheld until photos and complete commissioning sheets provided) supports a more comprehensive approach to recording commissioning, and allows detailed retrospective auditing.

Representatives of the project lead attending early installations can be beneficial for quality control; verifying installation work. Extra resource on site can also help support commissioning tests, in the early installations, as the team establish testing routines. Face-to-face contact on site at early installations can also reinforce the client-supplier relationship and clarity on client needs.

⁴ In general, attendance at the premises was expected within one or two days.

5.2.2 Technology function – ICB communication

The data communicated by ICBs has provided initial learning outcomes regarding communication analysis and behaviour that will be further explored as the project develops. In particular:

- Data from the Marlow cluster – where communication remained stable following reinstallation and all ICBs interacted with the MC – has provided initial confirmation that the reliability of ICB communication falls as expected when moving away from the substation. This has been reported in monthly network reports.
- One ICB repeating off another was also observed in the Marlow cluster; however, at a later point all ICBs appeared capable of communicating with the MC on their own, with the most distant ICB at a distance of 200m from the substation. This suggests that PLC can be a sufficient communication method at such a distance, and that ICBs may be able to repeat as and when needed, both of which are to be studied further.
- Marlow data also demonstrated how the charging of an EV at a particular ICB appears to interfere with the ICB communication to the MC (Figure 1). This was found when carrying out a detailed investigation of an initial snapshot of the collected data, which proved a useful process for identifying issues that require further investigation; the cause of the EV interfering with the PLC signal will be investigated.

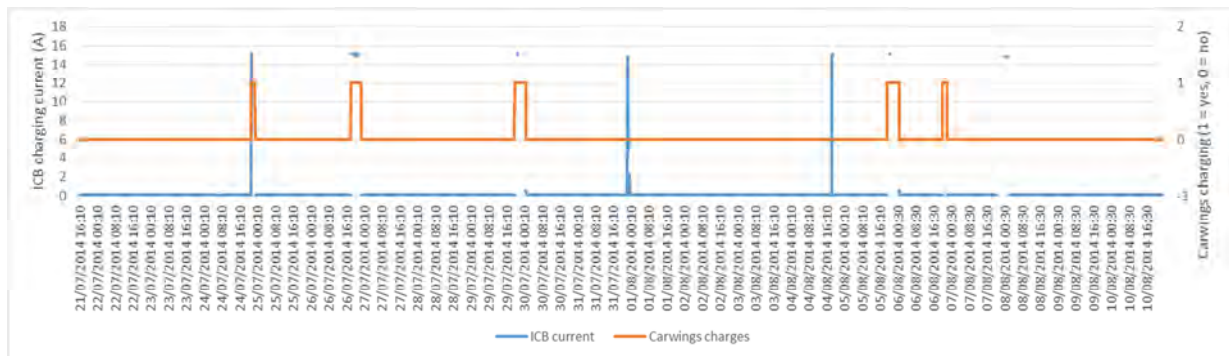


Figure 1 - ICB communication interference from EV charging

5.2.3 Technology function – Network performance and Esprit control

Data that has so far been collected from the technical trial clusters has also generated learning points around the performance of the monitored networks and the functionality of the Esprit control technology.

Patterns of daily phase currents on each monitored feeder have been produced on a monthly basis, and used to confirm that household demand includes morning and evening peaks and that there are ‘valleys’ in-between where EVs would be able to charge. This has been reported in monthly network reports, alongside Esprit thresholds (Figure 2).

This indicates that under ‘normal’ Business As Usual (BAU) conditions it is unlikely that switching of EVs (or other controllable loads) will be cycled during a period of low network capacity. It is expected that connected vehicles will simply be prevented charging until the network has fallen below the threshold; in the case of BAU this would be the cable rating. Where the network retains capacity for some EVs to charge, but not every vehicle connected, cycling of the vehicles being curtailed until the measured load either:

- Exceeds the threshold such that no capacity remains for any vehicles to charge;
- Reduces such that sufficient capacity is available for all vehicles attempting to charge.

Under BAU conditions, preventing the addition of any load that will result in exceeding cable ratings is desirable. For the purposes of the MEA Project, the thresholds being applied are lower than the cable ratings, being calculated to ensure operation of the Esprit system.

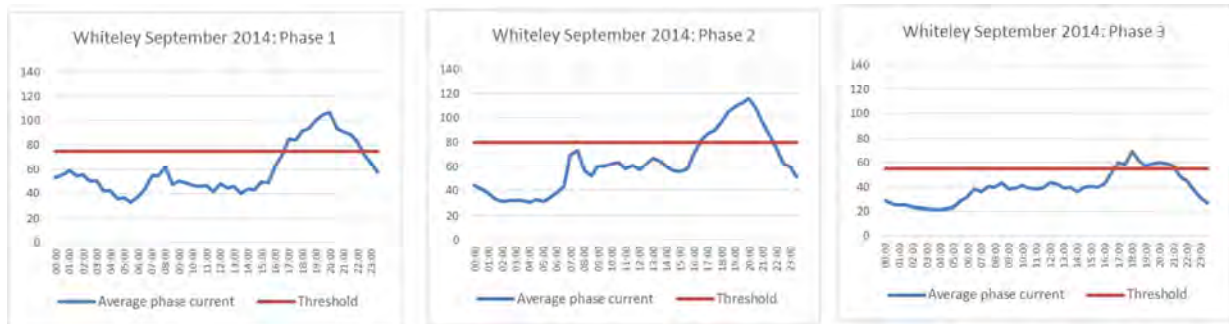


Figure 2 - Daily phase current patterns versus Esprit threshold (threshold set [and shown] lower than actual for the purpose of the trial)

5.2.4 Anticipated switching

Learning has been produced regarding the level of Esprit switching that is expected to occur within each technical cluster once ICB communication is re-established. CARWINGS charge data was used to generate a probability profile of EV charging that represents technical participants' aggregate behaviour to date (Figure 3). The charging profile below shows the distribution of charging events recorded by the project, segregated into 30 minute time periods. Checks were undertaken as to which periods were intersected by each charging event, without consideration of the duration of each event.

The resulting profile, along with the typical daily phase currents in each cluster, was used to show that approximately one third of cars within the project are likely to be attempting to charge during the period when Esprit will be curtailing charging based on the threshold settings. This was presented in a project deliverable "86002_4 – Cluster Threshold Settings v1.1".

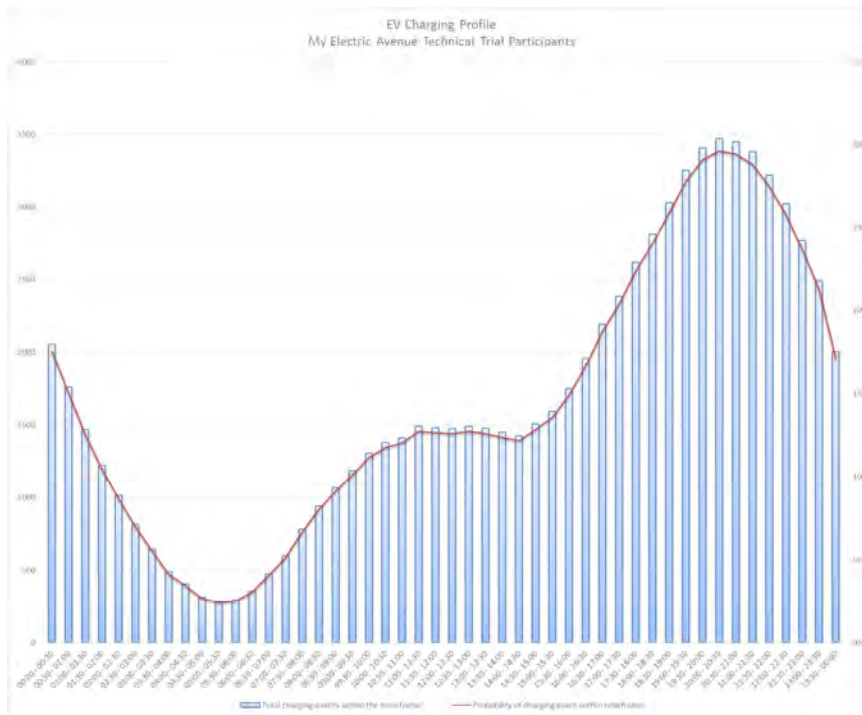


Figure 3 – EV Charging Profile

5.2.5 Probable EV network loads

The project is also in the process of generating learning on the contribution of the EV load to the feeder phase currents. The CARWINGS data is enabling the generation of probable EV load plots, definable nationally, by cluster, or by network area to forecast the load experienced as a consequence of EV charging throughout the day. As more data is captured these will become more accurate and will be included in the project dissemination, but the forecast load for the Marlow cluster based on the currently available charging data is included below.

It is noted that this forecast load curve is based on the charging data of the nine vehicles, and hence 31.5kW of connected capacity, based in Marlow; we provide this view as an insight and is not intended as a statistically robust output.

However, it is interesting to note that whilst the cluster currently has a high proportion of EVs being charged during the evening peak with a forecast load exceeding 7 kW, there is no record of any vehicle having been charged at approximately 0400. In other clusters, the forecast load is not as high but a level of charging is expected throughout the day.

Overall the data tells us the mixed message that peak EV demand is broadly coincident with peak household demand, however, there appears to be significant diversity. We look forward to providing a firmer view using peak winter data in the next reporting period.

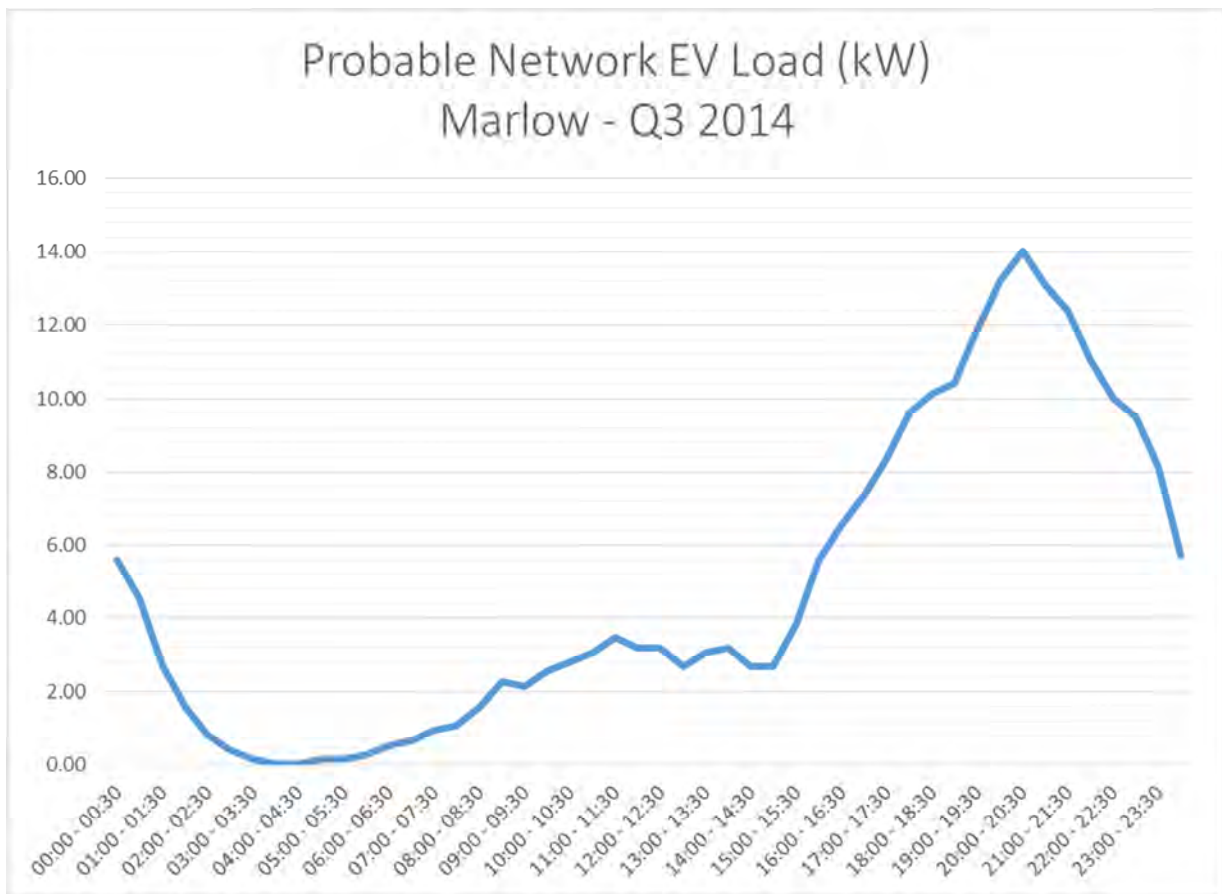


Figure 4 - Marlow Probable EV Load (based on a single quarter)

In the event that each of the 55 properties on the Marlow had an EV, with based on the above charging profile a peak EV load of 85kW would be expected to be introduced to the network between 20:00 and 20:30 each day.

5.2.6 Voltage variations as a consequence of EV charging

By monitoring both current and voltage at the ICBs, samples of data have further illustrated the extent of the relative voltage drop seen at the ICB at the participant’s home, when an EV is charging (Figure 5). This voltage drop is likely to occur primarily on the service cable, which could have implications for network design (e.g. assumed service voltage drops). This also raises the issue of power quality for customers connected by looped services. We would expect DNOs to be compelled to replace looped services with individual connections with EV ownership.

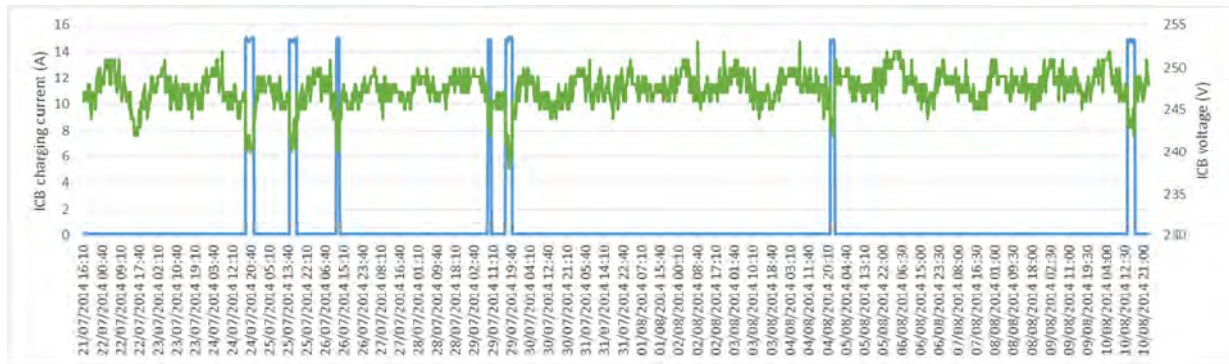


Figure 5 - ICB recorded voltage drops from EV charging

5.2.7 Evidence of Esprit operation

Esprit switching has been briefly observed during times of successful communication, in clusters with lowered thresholds:

- Time plots have been produced that visually confirm high phase currents as generally corresponding with Esprit control actions (Figure 6). In order to capture briefer periods of Esprit threshold breaches and assess the control mechanism in greater detail, 1-minute phase current data is now being collected (see section below on iHost monitoring)

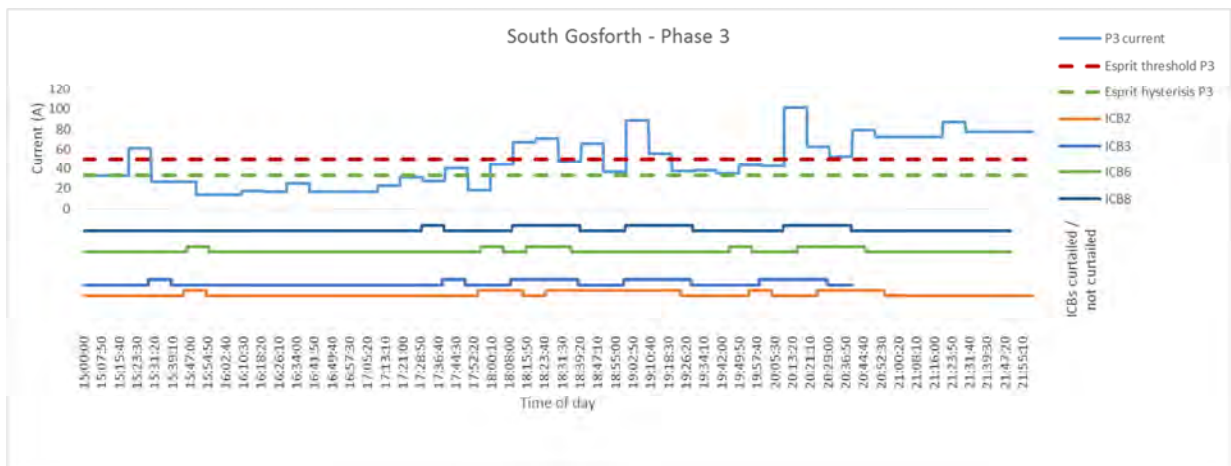


Figure 6 - Phase current versus Esprit threshold and EV Esprit control commands

- Data collected during September 2014 indicated that Esprit switching was seen in all clusters where the Esprit threshold was set sufficiently low to trigger switching and at least one ICB communicated with the MC. This was reported in the monthly network report and provides some confidence that Esprit is operating whenever communications can be established.
- Initial data also provides an indication that Esprit switching signals physically stop and start EV charging as expected, as mentioned in the monthly network reports, although further analysis is required to fully assess this.

Esprit threshold levels (and other MC and ICB settings) can only be set manually during a site visit, which requires access to the substation. This decision was taken for security reasons at the start of the project. However the unintended consequence of this decision is that changing of Esprit threshold levels now requires time and resources of several parties. The thresholds are determined with the goal of triggering curtailment of EV charging across a four hour period between 1800 and 2200 each day. This is intended to:

- Ensure sufficient operation of the Esprit to test the equipment functionality; and
- Trigger curtailment of charging across the evening peak, when it would be expected to operate under business-as-usual conditions.

Modelling carried out by University of Manchester will explore the maximum benefit that the Esprit technology may provide for different networks and EV penetration levels.

5.2.8 Communication reliability

The challenges of establishing consistent ICB communication have highlighted the importance of assessing the consequences of lower communication reliability on the functionality of Esprit. Initial metrics have been created, such as the proportion of time where the Esprit threshold is exceeded when the MC is able to communicate sufficient ICBs to curtail the required number of EVs. This type of work is still in draft stages but forms a wider learning point in terms of how to evaluate the acceptability of any PLC-based control system where 100% reliability is unlikely to be achieved.

5.2.9 Monitoring – Networks (iHost) and EVs (CARWINGS)

Monitoring of network data from MCs and ICBs via the Nortech iHost service has generated the following learning points:

- Data should be sampled at a greater rate than is being used for control purposes: The phase current data time basis was increased from 10-minute samples to 1-minute average values, in order to provide a more detailed view of the phase current values that triggers Esprit. This flexibility was available as the MC itself produces phase current reports on a 5-second basis.
- Monitoring requirements can have varying data requirements: University of Manchester’s network modelling work has highlighted that it would have been beneficial (although not essential) from a validation perspective if the voltage at substations had also been monitored, alongside the phase currents.
- GPRS data transfer reliability has been improved by moving to an hourly upload frequency as opposed to per minute data transfer: An alternative data transfer methodology was implemented during October, where data is uploaded on an hourly basis and transferred in bulk using csv files. The improvement in reliability is shown in Figure 7.

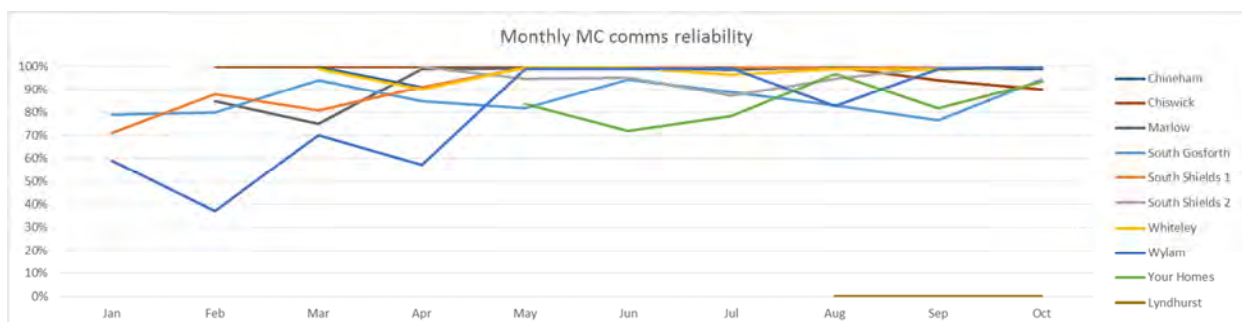


Figure 7 - MC communication reliability trend

It is essential when using several monitoring systems – such as the ICBs and MCs monitoring the network and in turn being transferred to iHost – that the details of the data processes are documented upfront, and that experts of each system are brought together to discuss consequences

and suitability of different system setups. Aspects of iHost data that have been handled as part of this project include:

- The on-site data collection system (Nortech's Envoy unit) generates its own default data points in response to events such as cold starts, and generates extra data points when ICBs fall in and out of communication. It is essential to confirm how such data points can be filtered out and treated within the data set.
- The data captured from ICBs in Nortech's iHost are treated in two separate ways, as either binary or analogue inputs. When data is stored using two methodologies in that way, it's vital to ensure that all data points are clearly tagged with a robust identifier (in this case the ICB serial number) to eliminate confusion at a later date as to what data can be attributed to what device.
- Meeting the equipment providers (Nortech) in person proved very effective at resolving uncertainty and providing reassurance around the setting of parameters within the user interface, and accessing data records remotely.

Monitoring of EV charging and trips via CARWINGS has generated similar learning points, illustrating again how the use of external monitoring systems require transparency and an understanding of the detailed data processes.

The process of downloading CARWINGS data from the Nissan system was developed in a series of stages:

1. A manual API;
2. An initial automated daily download of all historical data;
3. Reduced to a weekly basis in order to alleviate stress on Nissan's servers; and
4. Finally redesigned as a date-based daily download that collects only new data for each car.

Whilst a suitable solution for all parties has been arrived at, the multi-step process resulted from incorrect assumptions being made on both sides about how the download process would function with system specific limitations not being raised at the outset. An important learning point is to get all technical aspects clarified and confirmed upfront, where possible, although the corporate processes within a large company such as Nissan makes this a non-trivial task.

Furthermore, the Nissan CARWINGS monitoring system is an external system beyond the project's control, which carries the risk of relying on external parties for trouble shooting. Technical difficulties were experienced in relation to accessing the data of a group of EVs. Substantial effort was required to liaise with staff at different levels and departments within Nissan, depending entirely on them to resolve this problem. The issue has currently been resolved for all but a handful of EVs.

Finally, unexpected data features have been identified in the CARWINGS data, illustrating the need for validation processes. As it is an external dataset the project has to adapt to using what data is available, but it is vital to set up processes to detect non-standard behaviours within the data (such as trips of zero lengths), evaluate their impact, and define how they should be handled. Sets of validation tests have been designed and are in the process of being carried out for these purposes.

5.2.10 Monitoring – SQL database and dashboards

A SQL database on a server hosted by EA Technology has been created to download and store all iHost and CARWINGS data generated throughout the project. In addition to providing secure data storage, this is enabling straightforward access of data from two large data sets, as well as combining them as required for analysis.

The database is compatible with standard methods of data analysis utilised by all project partners and has therefore been linked to export directly to MS Excel.

It has also proven important to be able to quickly obtain an overview of the network performance and Esprit behaviour across all technical clusters. For this purpose, draft 'dashboards' have been developed that summarise network performance, communication levels, EV charging and Esprit switching statistics during a chosen time period, across each cluster (Figure 8). These Excel dashboards are in the process being automatically linked to the SQL database.

A further benefit of the cluster dashboards is the ability to provide consistent and easily repeatable reporting on cluster performance and these are being integrated into regular reports provided to SSEPD.

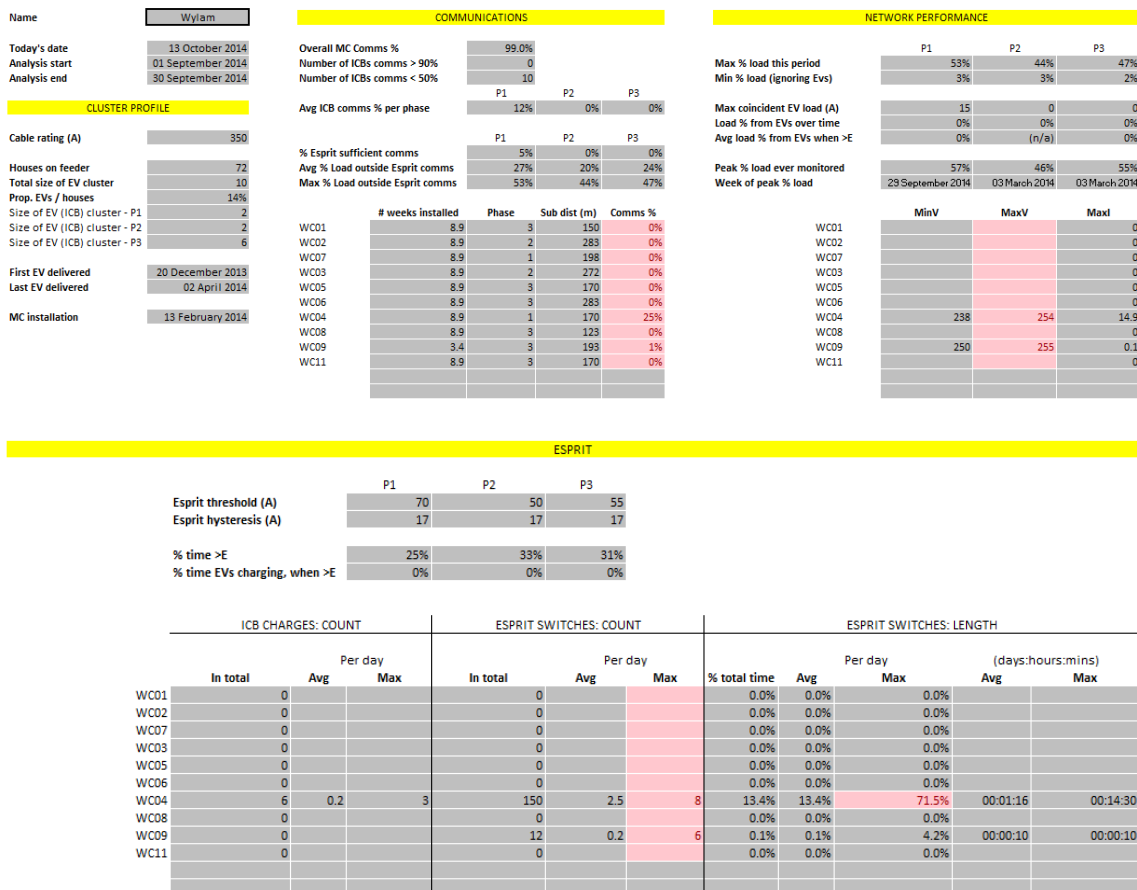


Figure 8 - Initial cluster 'Dashboard' report

5.2.11 Customer Engagement

The key learning points regarding customer engagement for this period relate to Task 4 activities, in particular the re-installation of equipment (ICBs), and verification of CARWINGS downloads.

- Frequent communication is still required between project partners; to
 - Avoid duplicated work
 - Ensure all partners are aware of changing situations
 - Ensures consistent communications to customers
- When a project requires skills that are not part of a DNO's BAU activities, (e.g. trouble shooting charging point defects), partners who specialise in this area can be hugely beneficial.
 - Zero Carbon Futures are highly experienced in communicating directly with customers on a daily basis, and resolving issues with charging points. Where cable defects have been identified, Zero Carbon Futures have been invaluable in managing repair/replacement work and maintaining customer relationships.

- Whilst customers understand that they have been recruited to take part in a research project, they demand a certain degree of flexibility. This applies to provide access to their home for installation works, but also for resolving CARWINGS downloading issues.
 - Open, timely and transparent communication with customers about installation plans and timescales has proved essential to managing expectations and supporting efficient installation. This has been supported through cluster communication and monthly bulletins to all Technical participants.
 - Contact with customers regarding steps required to register and establish their CARWINGS account have been made in evenings and weekends. This has meant that customers are available and are able to follow the required tests in their car and at their laptop. It should not be underestimated the level of 'hand-holding' required with some customers for resolving this process.
- Despite the project team defining and communicating a clear fault reporting process, customers may use other means (different telephone numbers, email addresses etc.) to contact the project team.
- Continued regular monitoring and managing of social media, namely the My Electric Avenue twitter account has proven efficient in capturing customer feedback and responding quickly.
 - Twitter has proved essential in capturing unforeseen customer grievances using CARWINGS.

5.3 An overview of the Project's approach to capturing the learning and disseminating

Learning continues to be captured in a learning log that is kept updated on an ongoing basis. The project has ensured dissemination of documentation, reports and key deliverables through a variety of mediums in addition to the requisite process for submitting documents to Ofgem.

- Newsletters;
- Attendance at specific industry events;
- Social media;
- Project website; www.myelectricavenue.info – hosting more information – ten top tips series etc, presentations. The intention is to move more documented learning onto the website for download.

The project is also currently exploring other avenues to disseminate. For example via webinars and other alternative routes following example of other LCNF projects using these routes (i.e. CLASS).

5.4 The main activities towards third parties which have been undertaken in order to disseminate externally the project learning

5.4.1 SSEPD – External Dissemination

SSEPD was able to present on the progress and planned activities of the project to a range of influential external stakeholders on multiple occasions.

- 5th August - 10 members of DECC's Science & Innovation and Heat & Industry teams joined members of SSEPD's Future Networks team at SSE's Zero Carbon Homes development to discuss the portfolio of innovation projects and the potential impacts and thus considerations needed by policymakers.

- 25th September - the project was invited to represent the work funded by the Low Carbon Networks Fund and present findings to Ofgem staff from a variety of departments at their annual internal innovation event which showcases the initiatives each department is undertaking. The project was well received and created considerable interest from staff at across all levels within Ofgem.
- 13th October - Ofgem held a two day workshop about projects that are involved in Demand Side Response and Demand Side Management, Distributed Generation and Storage. The workshop was attended by a mix of customers, DNOs, suppliers, customer interest groups and other industry bodies, and generated a significant number of questions and interest around the potential for the technology and processes being trialled in the project to become business as usual and the considerations needed.

5.4.2 EA Technology – External Dissemination

Learning Dissemination Activities

Following completion of all recruitment related Successful Delivery Criteria (9.5) in August 2014, other projects are looking to My Electric Avenue for advice on how best to engage with the public.

- Providing informal advice to other industry experts (Robert Sharpe) in relation to other projects within Nissan requesting support in customer engagement activities;
- Attendance at industry events, and advice provided to other delegates on recruitment approach, customer engagement and summary of learning in these areas.

The project has developed a suite of 'Ten Top Tips'; providing bite-sized, easily accessible information of learning from topics across the project. To date, these include: Novel Commercial Arrangements, Customer Engagement, Customer Recruitment, Procuring Partners and Trial Installations. These were disseminated during the Low Carbon Networks & Innovation (LCNI) Conference in October 2014 and can also be accessed on the project website⁵. The intention is to continue to add further topics to this series as the project progress.

Attendance at industry events, including Low Carbon Network & Innovation Conference on 20-22 October 2014, including presentations provided at the event:

- LCNI 2014: Tuesday 21 October Breakout session 1.1: Examining the impact of electric vehicle charging on the distribution network and investigating ways to mitigate and manage demand profiles through new technical and commercial mechanisms.;
- LCNI 2014: Wednesday 22 October Customer Partner Session: To demonstrate network operator collaboration and engagement with customers and partners, the benefits gained and lessons learned;
- SSEPD's presentation on My Electric Avenue project to Ofgem on 25 September 2014.

Marketing Activities

My Electric Avenue dissemination has changed focus slightly compared with previous reporting periods; whilst recruitment to the social trials has remained as a main focus, recent channels of communication have begun to share initial learning from the project. A wholesale review of contact

⁵ <http://myelectricavenue.info/project-learning>

lists for the various channels of communication has been conducted to ensure communication is targeted and relevant.

External dissemination continues to follow a planned schedule of newsletters and social media activity, appropriately timed to produce maximum impact following key events in the course of the project. A record of the planned dissemination, which has been carried out in this reporting period, is shown below.

Table 5-1: External Dissemination

Date	Method	Number
Newsletters		
13 October 2014	Newsletter issue 6	775 recipients, and mailing list via myelectricavenue.info (225)
8 September 2014	Branded email	574 recipients, and mailing list via myelectricavenue.info
Social Media		
	Twitter	@MyElectricAve #LCNI #nwenergy

To date (14 November 2014) 13 news items covering the My Electric Avenue project have also been published via industry titles. The following titles represent coverage from the last reporting period:

- Alternative Route Finance
- Business Car Manager
- BQ Live
- Energy Engineering (LCV2014 issue)
- Fleet news
- Fleetdrive Electric
- JT Hughes
- Leafstalk
- LowCVP
- MSN
- The Journal
- Transport Systems Catapult
- Zap Map

Publicity for the project and trials has been further supported by the production of videos providing highlights from the LowCVP event on 15th July 2014.

Other archived videos, are available to view via the project website⁶.

Further to planned press releases and newsletters, My Electric Avenue has also shared project news through a combination of emails, LinkedIn, and Twitter. The My Electric Avenue group on LinkedIn has 122 members; Twitter activity is building on the last reporting period with 292 tweets, 737 followers and 659 following. My Electric Avenue contributed 22 'tweets', representing 41% of all #LCNI tweets posted during the event (20-22 October).

My Electric Avenue has also been presented and represented at several industry events. A record of these is provided below.

⁶ www.myelectricavenue.info

- 15 July Low Carbon Vehicle Partnership (CVP) conference; panel discussion
- 17 July International Festival of Business - Clean & Cool; presentation
- July 2014: SSEPD Mid-term observations to Gas NIC Audience
- 10-11 September Cenex Low Carbon Vehicle; exhibition
- 23-24 September 2014⁷ Automotive Battery Management Systems
- 25 September Ofgem Internal Innovation Event
- 13 October IET International Hybrid and Electric vehicle Conference 2014 (representation by Zero Carbon Futures)
- 13 October Ofgem Work Stream 6 DSR, DG and Storage workshop
- 20-22 October The rebranded LCNI conference (formerly LCNF conference); exhibition, presentation and panel sessions
- 4 November Developing Systems of the Future Conference, presentation and panel discussion
- 12 November Smart Futures event: Demand Response; presentation and panel discussion

Whilst the project was not included within the presentations provided by speakers at Cenex LCV, the potential impact of electric vehicle charging on networks was discussed in detail with several charging point manufacturers at the event. These interactions also facilitated a high level discussion regarding feasibility of integrating Esprit technology within existing charging point hardware and software.

Planned attendance at upcoming events includes:

- Institute of Mechanical Engineering - Presentation to members as part of 'Knowledge sharing seminars'

My Electric Avenue has worked to promote the project in the wider industry by submitting an application for the Low CVP Awards and Utility Week awards. The project has also submitted an abstract for CIRED 2015, and successfully been accepted as a paper for presentation (dependent upon usual reviews).

University of Manchester are planning dissemination of early deliverables and additional analysis conducted via the IEEE Transactions on Power Systems Journal, to be submitted in January/ February 2015.

De Montfort University are planning to begin analysis of the quantitative and qualitative research they have undertaken in May/June 2015. As such the project anticipates De Montfort University to identify relevant conferences to present at within the next reporting period.

⁷ NB. Not all of these events are funded from the LCN Fund project (as many are funded directly by EA Technology or other project partners, but all will refer to My Electric Avenue and the positive stories of the LCN Fund.

5.5 Internal dissemination activities

5.5.1 SSEPD

SSEPD's dissemination focus during this period has been on internal stakeholder groups such as network planning design engineers and network operations. This approach has served two purposes:

1. It has aimed to raise awareness amongst staff that work in and serve these communities;
2. It is helping the project team to understand better the immediate areas of focus in advance of wider dissemination activities once substantive findings have been generated.

SSEPD has also worked to ensure project learning from one project is built into other projects as appropriate. For example, much of the customer engagement knowledge from this project has been directly relevant and embedded in the SAVE project; likewise the New Thames Valley Vision (NTVV) project has opportunities to reuse EV operational information gathered in this project whilst developing long-term scenario models for LV networks.

5.5.2 EA Technology

In the latest reporting period, EA Technology has disseminated progress and key learning internally through: Company internal social network, LinkedIn and at 'all company' meetings.

6 Business case update

The project team remain confident that the project learning will be achieved and there is no anticipated change to the overall cost.

There has been an increase in in-kind support provided by partners to the project, notably by Nissan providing a high specification car that includes the CARWINGS system by default. We also note that EA Technology are now delivering the project for £220k less and have reduced rates to manage the impact. Further details in this area have been covered in the submitted Change Request.

7 Progress against budget

It should be noted that the expenditure progress detailed below remains in comparison against the budget detailed in version 1.10 of the Project Direction, issued in December 2012. The Change Request (see section 2.1) seeks to update the budget, changing the distribution of funding across budget categories and tasks to mitigate:

1. The impact of transcription errors in the budget as originally submitted; and
2. The need to re-plan project activities to meet additional conditions imposed through the Project Direction.

As the Change Request is not yet accepted, the original budget remains valid for the current reporting purposes and consequently this report shows considerable variation from that budget in some areas.

7.1 Current project expenditure

The project expenditure to date, (data extracted to end of October 2014), is detailed in Table 7-1 and Table 7-2. It can be seen that to date, expenditure is below that forecast in the project bid submission; this is driven primarily by the funding restrictions enforced through the Project Direction preventing full implementation of technical trials.

Table 7-3 shows the current Forecast Cost At Completion for the project.

Table 7-1: Current expenditure against project category

	Total Planned Expenditure (£k) (Project Direction v1.10)	Current Expenditure (November 2014) (£k)	Utilised % of Planned Expenditure at November 2014
Labour	222.25	112.47	51%
Equipment	484.71	243.65	50%
Contractors	3,120.44	2,016.48	65%
IT	3.27	2.20	67%
Travel & Expenses	107.43	0	0%
Payments to users	311.76	279.12	90%
Contingency	400.40	238.64	60%
Decommissioning	26.29	0.18	1%
Other	72.88	0	0%
Total	4,749.43	2,892.74	61%

7.1.1 Variances in excess of 5%

There are three elements of the project that have experienced variation in the forecast costs at completion; these have been raised in previous project progress reports and are covered in greater detail in the initial and subsequent Change Request to the Project Direction submissions. For clarification, there is no change to the overall forecast cost at completion (FCAC) of the project.

Contractors – Task 02 – Customer Engagement

This task has exceeded the budget allowed for in the Project Submission (and subsequently the Project Direction) as a consequence of changes to customer recruitment plan originally proposed. These changes are a consequence of the additional clauses introduced through the Project Direction that would not have been achievable without significantly adapting the recruitment strategy.

The original project plan was to recruit in a staged manner, recruiting customers and deploying equipment utilising publicity from earlier clusters to assist in the recruitment of subsequent ones. The condition introduced by the Project Direction, to recruit the entire project's clusters prior to deploying any equipment, required the interaction with a wide range of potential clusters in parallel in order to achieve the necessary target.

This revised strategy successfully achieved the additional targets introduced by Ofgem, but with a significant increase in customer engagement effort and cost.

Contractors – Task 04_1 – Cluster Establishment

This task has exceeded the budget allowed for in the Project Submission (and subsequently the Project Direction) as a consequence of changes to customer recruitment plan originally proposed.

The need to cultivate significantly more clusters than would eventually be utilised, or were anticipated during the bid stage, required a high level of expenditure to investigate the potential networks and provide associated information to the cluster champions to aid in recruitment. As with Task 2, the need to undertake this work on significantly more clusters than had been planned has contributed to the increased costs.

Payments to Users – Task 04_1 – Cluster Establishment

This task has exceeded the budget allowed for within the Project Direction due to the transcription error that occurred during the bid submission process; this has been explained in details as part of the Change Request process.

The project has not spent more than had been allowed for within the Ofgem Category 'Payments to Users' as the transcription error erroneously allocated budget against the Project Contingency task in addition to Cluster Establishment.

Additional comments

It is noted that EA Technology are in the unique position of being 'Equipment Provider' and 'Engineering Consultant' within the project, with some staff members operating in both areas over the duration of the endeavour.

Table 7-2: Cumulative Project Expenditure – October 2014

Task ID	Ofgem Categories / Project Tasks	Original PD	Current Expenditure	% Expenditure of Budget
	Labour	£ 222.25	£ 112.47	51%
00	Novel Commercial Arrangement	£ 19.92	£ 3.48	17%
02	Customer engagement	£ 1.27	£ -	0%
04_2	Install technology and charging points	£ 37.44	£ 0.11	0%
04_1	Establishment of Customer / Cluster trials	£ -	£ 11.22	#DIV/0!
05	Monitoring the trials	£ 16.06	£ 1.52	9%
06	Trial participant interviews	£ 1.28	£ -	0%
09	Project recommendations and implementation	£ 6.73	£ -	0%
10	Dissemination	£ 30.48	£ 3.34	11%
11	Programme Management	£ 109.07	£ 92.81	85%
	Equipment	£ 484.71	£ 243.65	50%
04_2	Install technology and charging points	£ 484.71	£ 243.65	50%
	Contractors	£ 3,120.44	£ 2,016.48	65%
00	Novel Commercial Arrangement	£ 194.05	£ 148.94	77%
01	Initial background - evaluation of initial trial	£ 14.48	£ 8.71	60%
02	Customer engagement	£ 209.08	£ 284.79	136%
03	Integration of the Technology with charging points	£ 42.99	£ 1.93	5%
04_2	Install technology and charging points	£ 659.71	£ 385.69	58%
04_1	Establishment of Customer / Cluster trials	£ 346.42	£ 400.20	116%
05	Monitoring the trials	£ 103.77	£ 84.82	82%
06	Trial participant interviews	£ 202.36	£ 91.03	45%
07	Network Modelling	£ 214.84	£ 104.85	49%
08	Consultation with EV manufacturers - cycle times	£ 33.16	£ 6.92	21%
09	Project recommendations and implementation	£ 273.23	£ 65.80	24%
10	Dissemination	£ 230.73	£ 147.17	64%
11	Programme Management	£ 595.62	£ 285.63	48%
	IT	£ 3.27	£ 2.20	67%
05	Monitoring the trials	£ 3.27	£ 2.20	67%
	Travel & Expenses	£ 107.43	£ -	0%
04_1	Establishment of Customer / Cluster trials	£ 105.15	£ -	0%
05	Monitoring the trials	£ 2.28	£ -	0%
	Payments to users	£ 311.76	£ 279.12	90%
04_1	Establishment of Customer / Cluster trials	£ 199.18	£ 279.12	140%
12	Project Contingency	£ 112.58	£ -	0%
	Contingency	£ 400.39	£ 238.64	60%
04_1	Establishment of Customer / Cluster trials	£ 82.07	£ -	0%
12	Project Contingency	£ 318.32	£ 238.64	75%
	Decommissioning	£ 26.29	£ 0.18	1%
04_1	Establishment of Customer / Cluster trials	£ 26.29	£ 0.18	1%
	Other	£ 72.88	£ -	0%
04_1	Establishment of Customer / Cluster trials	£ 72.88	£ -	0%
	Total	£ 4,749.42	£ 2,892.74	61%

Table 7-3: Forecast Cost At Completion

Task ID	Ofgem Categories / Project Tasks	Original PD	Forecast Cost At Completion(FCAC)	% Expenditure of Budget
	Labour	£ 222.25	£ 219.25	99%
00	Novel Commercial Arrangement	£ 19.92	£ 19.92	100%
02	Customer engagement	£ 1.27	£ 1.27	100%
04_2	Install technology and charging points	£ 37.44	£ 0.11	0%
04_1	Establishment of Customer / Cluster trials	£ -	£ 36.93	#DIV/0!
05	Monitoring the trials	£ 16.06	£ 16.06	100%
06	Trial participant interviews	£ 1.28	£ 1.28	100%
09	Project recommendations and implementation	£ 6.73	£ 6.53	97%
10	Dissemination	£ 30.48	£ 30.28	99%
11	Programme Management	£ 109.07	£ 106.87	98%
	Equipment	£ 484.71	£ 274.30	57%
04_2	Install technology and charging points	£ 484.71	£ 274.30	57%
	Contractors	£ 3,120.44	£ 3,533.83	113%
00	Novel Commercial Arrangement	£ 194.05	£ 177.63	92%
01	Initial background - evaluation of initial trial	£ 14.48	£ 8.62	60%
02	Customer engagement	£ 209.08	£ 513.85	246%
03	Integration of the Technology with charging points	£ 42.99	£ 14.28	33%
04_2	Install technology and charging points	£ 659.71	£ 663.45	101%
04_1	Establishment of Customer / Cluster trials	£ 346.42	£ 472.05	136%
05	Monitoring the trials	£ 103.77	£ 102.00	98%
06	Trial participant interviews	£ 202.36	£ 258.03	128%
07	Network Modelling	£ 214.84	£ 228.72	106%
08	Consultation with EV manufacturers - cycle times	£ 33.16	£ 18.56	56%
09	Project recommendations and implementation	£ 273.23	£ 146.74	54%
10	Dissemination	£ 230.73	£ 220.20	95%
11	Programme Management	£ 595.62	£ 709.69	119%
	IT	£ 3.27	£ 2.70	82%
05	Monitoring the trials	£ 3.27	£ 2.70	82%
	Travel & Expenses	£ 107.43	£ 3.00	3%
04_2	Install technology and charging points	£ -	£ 0.40	#DIV/0!
04_1	Establishment of Customer / Cluster trials	£ 105.15	£ -	0%
05	Monitoring the trials	£ 2.28	£ -	0%
09	Project recommendations and implementation	£ -	£ 0.20	#DIV/0!
10	Dissemination	£ -	£ 0.20	#DIV/0!
11	Programme Management	£ -	£ 2.20	#DIV/0!
	Payments to users	£ 311.76	£ 279.12	90%
04_1	Establishment of Customer / Cluster trials	£ 199.18	£ 279.12	140%
12	Project Contingency	£ 112.58	£ -	0%
	Contingency	£ 400.39	£ 400.40	100%
04_1	Establishment of Customer / Cluster trials	£ 82.07	£ -	0%
12	Project Contingency	£ 318.32	£ 400.40	126%
	Decommissioning	£ 26.29	£ 31.84	121%
04_1	Establishment of Customer / Cluster trials	£ 26.29	£ 31.84	121%
	Other	£ 72.88	£ 5.00	7%
04_1	Establishment of Customer / Cluster trials	£ 72.88	£ 5.00	7%
	Total	£ 4,749.43	£ 4,749.43	100%

Notes:

1. Cost of trial equipment reduced by EA Technology to further subsidise the project and mitigate the transcription error.
2. Movement of budget to reflect better the anticipated effort requirements.
3. Movement of budget to accommodate additional requirements introduced as part of the Project Direction v1.10.
4. Movement of budget to correct transcription error.

7.2 Project funding allocations by task and category

The overall project expenditure to date and projected forward remains within the overall project budgetary restriction outlined in the Project Direction. The project is continuing in line with the plan outlined as part of the ongoing discussions relating to the Change Request to the Project Direction.

The available contingency for the previous financial year has been released to fund additional customer recruitment activities necessitated by the additional requirements introduced through the Project Direction.

8 Bank account

The bank account statement for the project, for the date range 01/06/2014 to 30/11/2014 is attached in Appendix B.

9 Intellectual Property Rights (IPR)

9.1 Current Reporting Period

The project has not generated any material that could be subject to IPR restrictions within this reporting period.

9.2 Next Reporting Period

The project is not expected to generate any material that could be subject to IPR restrictions in the next reporting period.

10 Other

The project is considered to be operating in line with the original submission aims and requirements, but is moving at a faster pace than was originally intended because of the additional terms introduced to project targets through the Project Direction v1.10. Despite this, My Electric Avenue (I²EV) is delivering wholly in line with the overall budget, spirit and intention of the project bid, whilst protecting the cost to, and interest of the customer. This is despite a shortfall of c£220k from the intended budget due to our transcription error, which has resulted in EA Technology committing additional in-kind contributions to the project.

Unforeseen issues have been experienced, either as a consequence, or exacerbated by the requirement to deliver all technical clusters in a simultaneous delivery fashion rather than a staged roll-out.

11 Accuracy assurance statement

The individual sections of this Project Progress Report have been prepared by the Task Leads managing the distinct areas of the project within EA Technology and collated into a single document by the Programme Manager. The document has subsequently been reviewed by the Project Director, who also holds the position of Future Networks Director for the business before sign-off for issue.

Within SSEPD, the Project Delivery Manager and Regulation Team have reviewed this document prior to final review and authorisation by the Director of Distribution.

Financial details are drawn from the SSE group-wide financial management systems and project bank account.

Prepared by:

Tim Butler	Programme and Task Manager	EA Technology
Becky Lees	Task Manager	EA Technology
Ellin Saunders	Task Manager	EA Technology

Reviewed by:

Dan Hollingworth	Head of Smart Grid Delivery	EA Technology
Dave A Roberts	Project Director / Future Networks Director	EA Technology
Nigel Bessant	Project Delivery Manager	SSEPD

Authorised by:



Dave A Roberts	Future Networks Director	EA Technology
----------------	--------------------------	---------------



Alan Broadbent	Director of Engineering	SSEPD
----------------	-------------------------	-------

15/12/14

Appendix A. Risk Register

Risk Identification	Risk Category	Date Risk Report	Target date for addressing risk	Risk Details	Affected Parties	Pre-Mitigation			Overall Risk	Post-Mitigation			Contingency Action in Event Risk is Realised			
						Likelihood	Severity	Mitigation Measure		Cost of Mitigation	Mitigation Applied	Responsible for Risk Mitigation		Likelihood	Severity	Overall Risk
074	Business (AI)	12 Sep-13	30/06/2014	Change Request to update Project Direction (from v1.10) is rejected by Ofgem, preventing movement of funds between categories. Severely impacted Categories if rejected are Labour, Decommissioning and Contingency.	EA Technology	Probable	Severe	Severe	Ensure clarity of rationale behind update request is clear within the document. Ensure document is reviewed by SSE Regulation Team. Open dialogue with Ofgem to resolve issue.	£ 15,000.00	Yes	EA Technology	Probable	Severe	Severe	Clarify the specific elements of sub-contractor involving to ensure maximum alignment with Project. Tasks outlined at bid stage. (For example ZCF contract to cover purchase and installation of charging to be allocated against Installation of Equipment rather than Establishment of Clusters). Utilisation of Project Contingency.
023	Unallocated	01 Jan-13	31/12/2015	Due to the nature of the project (research trials into new experimental technology) it is reasonable to assume that risks that have not been specifically foreseen will occur. This line allows for the impact of currently unforeseen risks. Insufficient funding available in budget.	All parties	Almost Certain	High	Severe	Ensure regular updates/meetings/conferences held between all parties to discuss adherence to the project plan and identify risks and blockers to progress of the project.	£ -	Ongoing	All parties	Almost Certain	Moderate	High	Contingency plans to be developed as specific risks and/or blockers are identified/realised.
026	Business (AI)	01 Jan-13	31/12/2015		EA Technology	Probable	High	High	Re-forecast task expenditure by category for resubmission of Project Direction criteria. Analysis and planning of individual tasks to determine necessary budgets. Fixed price contracts from some suppliers have been quoted at lower than the amount forecast in budget. Note Sep 2013: Likelihood increased from possible to probable due to number of people involved in meeting SDC requirements relating to cluster requirement.	£ -	Ongoing	EA Technology	Probable	High	High	
027	Business (AI)		31/12/2015	Interest rate risk arising from the interest expectations made by Ofgem. (Assumption made by Ofgem that project funds would accumulate interest at a rate of (Bank of England base rate + 2%).	SSEFO	Almost Certain	High	Severe	SSEFO to discuss with Ofgem, EMA and other ODNs the implications and potential mitigation measures for this and all other Tier 2 bids.	£ -	Ongoing	SSEFO	Almost Certain	Moderate	High	
012	Technical	01 Jan-13	31/12/2014	PLC cannot be fitted in substations or communication medium fails. Update: PLC successfully installed in all clusters except for Lyndhurst. The LV network for this cluster consists of Overhead line requiring different methods of connection for the Monitor Controller. Update: Communication issues experienced during periods of high volume communications.	EA Technology AND/Tr	Probable	Moderate	Moderate	Repeater units will be installed where required to ensure communications between ICs and the relevant MC. MCs installed in all but Lyndhurst cluster. Only one remaining cluster different to those already installed and has been designed. Lyndhurst connections designed and approved, scheduled for installation mid-November. Adaptations to control system functionality under test with an alternative method of connectivity to control charging points being investigated.	£ -	No	EA Technology	Possible	Moderate	Moderate	
021	Business (Internal)	01 Jan-13	31/12/2015	EATL unable to provide sufficient resources in the timescales necessary to deliver the project.	EA Technology	Probable	High	High	Active recruitment of additional staff is currently underway. Planning of the project to allow for anticipated resource availability as far as is reasonably practicable. Update Sep 2013: Significant number of staff within EA Technology highly involved in delivering the project, further dipping the post mitigation risk.	£ -	Yes	EA Technology	Possible	Moderate	Moderate	Other projects will be delayed if there is insufficient resource and new resources are not employed in time. If necessary Preference contractors will be used to supplement the internal resources.
022	Business (Internal)	01 Jan-13	31/12/2015	EATL spend more time project managing due to the risks detailed occurring. Significant levels of effort required beyond that originally anticipated at bid stage.	EA Technology	Almost Certain	Moderate	High	Ensure regular updates/meetings/conferences held between all parties to discuss adherence to the project plan and identify risks and blockers to progress of the project.	£ -	Ongoing	EA Technology	Probable	Moderate	Moderate	Project management processes will aim to resolve problems at the earliest possible time to limit costs.
030	Technical		31/12/2015	Security risk from data transmission. Data/control signals can be intercepted. Data can be blocked from receipt.	EA Technology AND/Tr	Probable	Moderate	Moderate		£ -	No	EA Technology	Unlikely	Moderate	Moderate	
035	Business (Client)		12/03/2014	Project Timeline: Critical tasks and deliverables not achieved in line with Project Plan.	EA Technology	Probable	High	High	Highlight critical tasks / deliverables and review process timescales. Provide a schedule of anticipated document delivery in order to plan suitable resource availability. As much notice as possible will be provided regarding individual documents, with requirements for authorisation and impact of those dates being missed. Rolling schedules will be provided for near future months.	£ -	Ongoing	EA Technology	Possible	High	Moderate	
036	Business (AI)		31/12/2015	Possibility that SSEFO Steering Group members do not understand all details of Project Specific risks due to lack of direct, day to day involvement in the project.	EA Technology	Possible	High	Moderate	EATL staff (Dave A Roberts) to attend Steering Group meetings and maintain regular contact with SSEFO counterparts to minimise the impact of any mis-communication.	£ 18,000.00	Ongoing	EA Technology	Unlikely	High	Moderate	
037	General Public		12/03/2014	Exit strategy for managing participants who need to leave the project. Loss of job. Move house. Egprit fails and causes low voltage events or power failures.	EA Technology Fleetdrive Electric	Almost Certain	High	Severe	If withdrawing from the project Return of vehicle cannot be enforced by the project as lease contract does not commercially pass through any company within the MFA project. Risk alerts are set up for each cluster to trigger warnings as required. First choice feeders will be limited to feeders that are believed to be able to handle 10 EVs without Egprit. Second choice would involve phased implementation to allow monitoring of limits in parallel with frequent discussion with Ofgem to push for reduced participation requirements for feeder cluster.	£ -	No	EA Technology Fleetdrive Electric	Possible	Low	Moderate	Process document prepared to guide a fair and unbiased approach to making decisions relating to participants wishing to withdraw from trials.
041	Technical		31/12/2015		EA Technology	Possible	High	Moderate	Aug 2013: Egprit units will be set up to 'fall on' so in the event of communication failure customer vehicles will not be prevented from charging. Nov 2014: Evaluation of each cluster undertaken to determine security of the network in the event of non-functionality of the Egprit system. Cluster specific mitigation events determined where required. SSEFO to provide specifics of the requirements that must be adhered to by all partners and suppliers for inclusion in the contracts. Request this information from NPG as well for inclusion in contracts in preparation for undertaking working in NPG area.	£ -	Ongoing	EA Technology	Possible	Moderate	Moderate	
042	Business (Contractor/Supplier)		31/12/2015	Trial partners / suppliers miss an appointment slot with trial participants. Excess callouts by participants due to 'failures'.	EA Technology SSEFO	Possible	High	Moderate	Revisits conducted out of hours - evenings and weekends to reduce inconvenience. All possible efforts to reduce number of revisits (tackle several actions in one visit rather than several).	£ 1,000.00	Ongoing	EA Technology	Unlikely	Moderate	Moderate	
044	General Public		31/12/2015	PLC causes perceived health issues. long term safety of operation, e.g. overheating	EA Technology	Possible	Moderate	Moderate	Respond with a national, consistent message either via letter, phone or in person. The Egprit system will be enclosed in a sealed, hardened plastic case to prevent any equipment failures causing damage to surrounding infrastructure. The equipment specification will ensure suitable safety measures to disable equipment if deemed necessary. ICBs were designed to the MML unit improving safety and further reducing the risk of overheating problems.	£ 1,000.00	No	EA Technology	Possible	Moderate	Moderate	
047	Technical		30/06/2014		EA Technology	Possible	High	Moderate		£ 500.00	Yes	EA Technology	Possible	Moderate	Moderate	

I2EV 4th Project Progress Report: July 2014 – December 2014

Risk Identification	Risk Category	Risk Details			Affected Parties	Pre-Mitigation			Overall Risk	Post-Mitigation			Overall Risk	Contingency Action in Event Risk is Realised			
		Date Risk Based	Target date for addressing risk	Risk Details		Likelihood	Severity	Mitigation Measure		Cost of Mitigation	Mitigation Applied	Responsible for Risk Mitigation			Likelihood	Severity	
048	Technical		31/12/2015	External factors prevent operation of Eqrpt, e.g. Lightning Strike - Eqrpt fails and prevents charging. - Eqrpt fails and prevents control unit from stopping charging potentially allowing an overload of the network.	EA Technology	Possible	Moderate	Moderate	Aug-2013: Eqrpt units will be set up to fail on so in the event of communication failure customer vehicles will not be prevented from charging. - Sep-2013: In the event of a lightning strike or similarly disruptive event, all charge points should default to 'not allowing charging to occur but damage resulting from the 'event cannot be predicted at this stage.'	£	-	No	EA Technology	Possible	Low	Moderate	
062	Technical		30/08/2014	- Estimated that 50% of domestic installs are complex requiring additional effort and cost to complete the installation. - Estimated that 50% of business cluster installs are complex requiring additional effort and cost to complete the installation.	EA Technology Zero Carbon Futures	Almost Certain	Moderate	High	Management of forming clusters, prioritising those that are anticipated to be lower difficulty relating to installation if sufficient quantities of clusters are available.	£	-	No	Zero Carbon Futures	Probable	Moderate	Moderate	Contingency allowance included for within 2CF estimates at start of project. Value of £26,750 was allowed for and so is held within the contingency budget as 2CF will call upon it only if required.
063	Business (Client)		31/12/2015	Lack of suitable available resources within the DNO prevents development of: - Methods of working - Standard installation methods/designs. - Identification and establishment of potential cluster sites.	SSEPD	Probable	High	High	Allocation of specific, named resources to provide support to the project in the specific areas required.	£	-	Ongoing	SSEPD	Possible	High	Moderate	
067	Technical		15-Jul-13 31/12/2015	Failure of Eqrpt equipment results in damage to the distribution network.	EA Technology	Possible	Severe	High	- Testing and commissioning tests to improve confidence in the equipment's reliability will be undertaken. - Undertake network modelling of the proposed network cluster areas to ensure that the capability exists to install the Electric Vehicles without adversely affecting the network. - If modelling suggests potential problems will be encountered in the event of cluster establishment, advice will be sought from the respective DNO.	£	1,500.00	Yes	EA Technology	Unlikely	Severe	Moderate	
068	Technical		15-Jul-13 31/12/2015	Failure of Eqrpt equipment results in customer's car being unavailable for use.	EA Technology	Possible	Moderate	Moderate	- Testing and commissioning tests to improve confidence in the equipment's reliability will be undertaken. - Brief customers on available actions in the event the EV is unavailable for use due to insufficient charge. - Provide support in Welcome Pack should car be insufficiently charged due to Eqrpt - and instructions on how to reimburse tax costs.	£	1,000.00	Yes	EA Technology	Possible	Low	Moderate	Customer will be able to utilise a local taxi firm and re-claim the fare from the project if the car should have been charged but was not due to a failure of the trial equipment. If Eqrpt functioned as designed then no payment for the use of taxis will be provided. £50,000 was allowed for in the project budget to cover parking of additional customer vehicles and to cover taxi fares if required. This has been reduced in the current charge request.
072	General Public		12-Sep-13 31/12/2015	Insufficient data available on EV use and charging habits as trial participants do not complete surveys in sufficient quantities in suitable timeframes. Result will be that stated recommendations may later prove to be invalid.	EA Technology	Probable	High	High	Provide incentives to customers to complete the surveys, (e.g. prize draw entry).	£	300.00	No	EA Technology	Possible	High	Moderate	
073	Business (All)		12-Sep-13 10/01/2014	Request for Project Direction Update from IT 10 is rejected by Ofgem, preventing movement of funds between Ofgem Categories. Severely impacted tasks if rejected are Customer Engagement and Cluster Establishment (including funding of vehicles and purchase of equipment).	EA Technology	Almost Certain	High	Severe	- Ensure clarity of rationale behind update request is clear within the document. - Ensure document is reviewed by SSE Regulation Team. - Open dialogue with Ofgem to resolve issue. - Continue responding to Ofgem's requests for clarification and offer meetings / teleconferences to resolve concerns they may have.	£	12,500.00	Yes	EA Technology	Possible	High	Moderate	Clarify the specific elements of sub-contractor invoicing to ensure maximum alignment with Ofgem cost categories. (For example 2CF contract to cover purchase and installation of charging to be allocated against Equipment rather than Contractors). Utilisation of Project Contingency.
081	Business (All)		07-May-14 31/08/2014	Reputational risk to EA and partners as a result of car delivery delays.	All partners	Probable	Moderate	Moderate	- Escalation in Nissan to rectify delays - additional time spent by Fleetlive and EATL. - Monitor twitter comments.	£	20,000.00	Ongoing	EA Technology	Probable	Moderate	Moderate	
084	Business (Internal)		07-May-14 31/08/2014	CARWINGS account not activated on all customer cars by the dealership, therefore data from cars not captured and lost from project.	Nissan, EA Technology, DMU, UoM	Possible	Moderate	Moderate	CARWINGS data is not essential and is not a deliverable, but would be powerful to add to the collected data to support deliverables. FD contacting all participants to confirm they have an account and are pressing the button each time they drive. Instructions are also in the welcome pack, and in the delivery note.	£	5,000.00	Ongoing	EA Technology	Possible	Moderate	Moderate	
086	Business (Internal)		19-Jun-14 31/08/2014	Inability to locate up to date information on database (functioning but not yet fully completed with historic data).	All parties	Probable	High	High	EA Technology conducting internal spot checks on data. ZIP back filling data generated by them while database was under construction. Fleetlive Electric conducting test on data field entries.	£	5,000.00	Ongoing	EA Technology/ Zero Carbon Futures/ Fleetlive Electric	Probable	Moderate	Moderate	Continuation of weekly updates to DMU to ensure no data is lost as a result of target delivery dates missed. More reliance on weekly calls to support incomplete data in the database.
088	Business (Internal)		Jun-14 31/08/2014	Error in CARWINGS process (Nissan internal issue) - 3 participants cannot activate CARWINGS. - 3 participants have been able to activate CARWINGS and access their data although this information is not being provided to the project via the Nissan API. Data is being lost for participants unable to activate their connection to the CARWINGS system.	EA Technology, DMU, UoM	Probable	High	High	Escalating within Nissan.	£	15,000.00	Ongoing	Nissan	Possible	High	Moderate	
090	Business (Contractor/Supplier)		10-Nov-14 01/11/2014	Delays to deployment of the technology have resulted in adaptations to the planned approach for collection of data relating to the social elements of the project. Specifically interviews and focus groups to ascertain the impact of the Eqrpt technology on the use of the vehicles after a period of unconstrained charging have not yet been implemented. There is a risk to the undertaking of interviews and focus groups later than initially planned due to resourcing constraints in De Montfort University.	EA Technology, DMU	Possible	High	Moderate	ANDR are prioritising delivery of the revised software to enable wider scale deployment in early December 2014. This will enable social research to continue as planned. Discussions are underway to reschedule the sessions around available resourcing to ensure the targeted learning is still achieved in the event software deployment is not able to be completed until January 2015.	£	1,000.00	Yes	EA Technology	Possible	Moderate	Moderate	Finalise revised schedule and implement as soon as possible following software redeployment.
097	Business (All)		01-Jan-13 31/12/2015	Availability of loss of key resources.	All parties	Possible	Moderate	Moderate	Consider succession strategies, identify and ensure suitable knowledge transfer and training to potential replacements.	£	-	Ongoing	All parties	Unlikely	Low	Low	Provide support to their resources to bring them up-to-speed as quickly as reasonably practicable.
046	Technical		30/08/2014	Rise of earth potential.	EA Technology	Unlikely	Moderate	Moderate	Unlikely to occur as a result of charging point installation if electrical system in property and surrounding area is correct and in a good state of repair. To mitigate against this possibility, work in the PEV project to be undertaken by suitably competent contractors.	£	-	Ongoing	EA Technology	Unlikely	Low	Low	
049	Technical		31/12/2015	Operational changes affect operation of Eqrpt. - Closure of NCP causes controller interference.	EA Technology	Possible	Low	Moderate	Rearrangement of local networks should not occur without respective design teams accounting for the project equipment. Sep-2013: Developing a clear schedule of live network testing during a trial.	£	-	No	EA Technology SSEPD Northern Powergrid	Unlikely	Low	Low	
052	Technical		31/12/2015	Equipment disruptively fails in substation.	EA Technology	Possible	High	Moderate	Provide clear instructions for maintenance crews (detailed guide in substations). - Possibly override system if loading is light (e.g. in summer) - Installation of a spare charger on another feeder.	£	1,000.00	No	EA Technology	Severe	High	Low	

Appendix B. Project Bank Account Statement

Bankline



Statement for account **-*-*-* * from 01/06/2014 to 30/11/2014

Short name:	SOUTHERN ELECTRIC PO	Currency:	GBP
Alias:	SOUTHERN ELECTRIC PO	Account type:	SPECIAL INT BEARING
BIC:	*****	Bank name:	NATIONAL WESTMINSTER BANK
IBAN:	*****	Bank branch:	READING MKT PLACE

Date	Narrative	Type	Debit	Credit	Ledger balance
	CLOSING BALANCE				1,851,741.57Cr
03/11/2014	SOUTHERN ELECTRI I2EV COSTS	EBP	123,706.23		1,851,741.57Cr
30/09/2014	30SEP*****	INT		1,715.03	1,975,447.80Cr
29/09/2014	SOUTHERN ELECTRI I2EV COSTS	EBP	756,160.23		1,973,732.77Cr
30/06/2014	30JUN*****	INT		1,744.50	2,729,893.00Cr
	OPENING BALANCE				2,728,148.50Cr
Totals			879,866.46	3,459.53	