



My Electric Avenue

MONTH 36 INDEPENDENT REVIEW REPORT

Project Number Q005691
Document Number RD15-002325-3
Date 4 December 2015
Client Confidential EA Technology Ltd

Authors Jane Patterson

Contributors Julian Dunn
Michael Stocker

Approved (Ricardo)

A handwritten signature in black ink, appearing to read 'Julian Dunn', written over a light blue horizontal line.

Julian Dunn

LCN Fund Project Number: SSET205

Project Acronym: I²EV

Project Title: Innovation-squared: managing unconstrained EV connections

Alternative Project Title: My Electric Avenue¹

Funding Scheme: Second Tier
Ofgem Low Carbon Networks (LCN) Fund

Funding DNO: Scottish and Southern Electric Power Distribution (SSEPD)

Third Party Lead Supplier: EA Technology Ltd

Other Project Partners: Fleetdrive Electric
Nissan
Northern Powergrid
Zero Carbon Futures

Subcontractors: University of Manchester
De Montfort University
Automotive Comms
Ricardo
ANDtr
Creative Concern

Project Start Date: 7 January 2013

Project End Date: 31 December 2015

Project Website: <http://myelectricavenue.info/>

Type of Review: Periodic 6-monthly independent review

Period covered by review: 1 July 2015 to 30 November 2015 (see Chapter 2)

Names of Reviewers: Julian Dunn (JD10) Tel: +44 (0)1926 477097
Email: julian.dunn@ricardo.com

Jane Patterson (JAP) Tel: +44 (0)1273 794007
Email: jane.patterson@ricardo.com

Other contributors to this review: Michael Stocker

Version History

Date	Version	Issued by	Notes
20-Nov-2015	RD15-002325--1	JAP	First issue (draft), for discussion with EA Technology
1-Dec-2015	RD15-002325--2	JAP	Complete Report Updated following M36 Review Meeting with EA Technology
4-Dec-2015	RD15-002325--3	JAP	Minor typos corrected, following feedback from EA Technology

¹ 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.

EXECUTIVE SUMMARY

The My Electric Avenue project has trialled a new technology, called Esprit, for managing the supply of electricity to electric vehicles connected to a local distribution network. This project, funded by Ofgem's Tier 2 Low Carbon Network (LCN) Fund, has also trialled a novel commercial arrangement.

Unusually for a LCN Fund project, the project has been led by EA Technology as the Third Party Lead Supplier, with Scottish and Southern Energy Power Distribution Limited (SSEPD) as the host Distribution Network Operator. The other project partners are Northern Powergrid, Nissan, Fleetdrive Electric and Zero Carbon Futures. Further support has been provided via subcontractors, which include the University of Manchester, De Montfort University, Ricardo UK Ltd, Automotive Comms, and Creative Concern.

This report is the sixth and final periodic 6-monthly Independent Review. It covers the Reviewers overall assessment of the project.

The reporting period is 1 July 2015 to 30 November 2015², principally involving:

- **Commercial** – Completing SDRC 9.2 & 9.3 on the learning from the novel commercial arrangement, and recommendations for improving the processes
- **Technical Trial** – Completing the Technical Trial and decommissioning Esprit technology; completing data collection and analysis; completing SDRC 9.6 and SDRC 9.8 reporting the results from the Technical and Social Trials
- **Social Trial** – Completing the Social Trial, and reporting the results in SDRC 9.6 and SDRC 9.8
- **Project Management** – Ongoing effective project management and coordination of project partner activities; planning final dissemination activities; ensuring all reporting is completed on time, and managing the document review processes

The review is based upon key documents delivered to Ricardo for the purpose of the review, and has been augmented with formal and informal discussions during project meetings and conference calls with EA Technology.

Overall assessment of the project

What is the Reviewers' overall assessment of the project so far?	Excellent
Have the key objectives for the period been achieved?	Yes
Has the project made satisfactory progress towards meeting the overall project objectives?	Yes
Has each Task made satisfactory progress against the Plan of Works?	Yes
Has the project management been performed as required?	Yes
Has the collaboration between project partners and sub-contractors been effective?	Yes

² The timing of this review was adjusted from 6 months to 5 months so that EA Technology and SSEPD could prepare their response to the M36 Independent Review prior to completing the project on 31 December 2015

Is there evidence of underperforming project partners or sub-contracts, lack of commitment or change in interest?

No

Have the project partners adequately publicised the project to raise awareness of the project with the general public?

Yes

Have the project partners adequately disseminated results and learning from the project?

Yes

The My Electric Avenue project has been very successful. Both the commercial and technical innovations have been demonstrated and shown to add value. The project has been delivered using a novel commercial arrangement, with SSEPD as the lead DNO and EA Technology as the Third Party Lead Supplier. The Esprit technology has proven the concept of demand side response (DSR) control of EV charging to protect LV networks.

EA Technology have continued to work professionally and diligently in their role as project coordinator, successfully managing a complex arrangement of project partners and subcontractors. Teamwork within the project consortium has been excellent, with enthusiasm and morale remaining high throughout the project.

The My Electric Avenue team responded well to the various challenges encountered during the project. The changes imposed by Ofgem led to innovations in the recruitment approach, which yielded very high levels of public interest in the project. The agility and flexibility of the focused project team enabled them to respond quickly to the various issues encountered with the Esprit technology.

The My Electric Avenue project has collected a wealth of technical and social data regarding EV charging and user behaviour. This unique data set includes technical data from the electric vehicles, technical data from the monitoring of the low voltage systems and Esprit technology, and the social data concerning the experience of the Technical and Social Trial participants. Much learning has already been gleaned from this data, which has been reported in the Successful Delivery Reward Criteria reports.

The project has also delivered additional learning, such as the report on PLC communication and the Top 10 Tips series. Learning from My Electric Avenue will help to inform future projects seeking to develop demand side response (DSR) tools. It is likely that the MEA data set will be valuable input for many future academic and research projects in the UK and beyond.

However, one significant area of concern which must be addressed for future innovation projects with a novel commercial arrangement, is the high level of risk imposed on EA Technology by Ofgem via the restrictions outlined in the Project Direction. SSEPD and EA Technology have highlighted several areas for process improvement in the SDRC 9.2 & 9.3 report. These recommendations must be duly noted and actioned by Ofgem to improve the management and operation of future innovation projects.

Highlighted Strengths

- **Strong leadership** by the Third Party Leader Supplier, EA Technology
- **Teamwork, dedication and long term commitment** of the project partners and subcontractors
- **Recruitment** of participants for the Technical and Social Trials

- **Good management of customer relationships** by EA Technology, Fleetdrive Electric, Zero Carbon Futures and De Montfort University throughout the Technical and Social Trials
- **Timely and effective public engagement** through press releases, newsletters, social media, press days, and the project website
- **Good understanding of the data collected**, and rich data set for future research projects
- **Dissemination of project learning** through website publications (e.g. Top 10 Tips series), conference presentations, webinars and technical journal papers

Recommendations

- For the successful uptake of similar novel commercial arrangements in future LNC Fund projects, **Ofgem must recognise the Third Party Lead Supplier in their role as project coordinator**
- **Technology risk mitigation** measures should be incorporated into the scope of work for any innovation project, such as phasing the roll-out of the technology under trial
- **Requirements for data collection and analysis** must be considered at the beginning of the innovation project, and these requirements and activities should be updated regularly as the project progresses
- **Learning from the My Electric Avenue project** should be incorporated into the next generation of Esprit technology, which will require further development if it is to become a commercial product
- **Further analysis** of the data collected during the My Electric Avenue project will lead to more learning, which should be suitably accredited back to the MEA project



TABLE OF CONTENTS

- 1 Introduction..... 7
- 2 Scope of this Independent Review 9
- 3 Overall Assessment.....18
- 4 Progress towards Objectives20
- 5 Progress against Work Plan22
- 6 Response to Previous Recommendations24
- 7 Independent Review of the Successful Delivery Reward Criteria and Other Deliverables26
- 8 Implementation of the Project28
- 9 Dissemination of Project Learning29
- 10 Highlighted Strengths32
- 11 Recommendations for Improvements and Adaptions to the working Practices34
- Appendix 1 Project Task Structure36
- Appendix 2 List of Successful Delivery Reward Criteria (SDRC) and Other Deliverables41
- Appendix 3 Explanation of RAG indicators for each review question49
- Appendix 4 My Electric Avenue Data Collection Tools.....50
- Appendix 5 Ricardo comments on documents provided for Review & Information.....52
 - Appendix 5A SDRC 9.2 & 9.3 Report52
 - Appendix 5B SDRC 9.6 Report.....54
 - Appendix 5C SDRC 9.8 Report and Input Documents56
 - Appendix 5D Evidence of Successful Decommissioning.....60
 - Appendix 5E Learning Log61
 - Appendix 5F Approved Change Request to the Project Direction61
 - Appendix 5G Project Deliverable Map62
- Appendix 6 Ricardo comments on other documents considered during this Review.....63

My Electric Avenue

MONTH 36 INDEPENDENT REVIEW REPORT

1 INTRODUCTION

The "My Electric Avenue"³ (MEA) project has trialled a new technology, called Esprit, for managing the supply of electricity to electric vehicles connected to a local distribution network. The project is funded by Ofgem's Low Carbon Networks Fund (LCNF)⁴. Southern Electric Power Distribution, part of Scottish and Southern Energy Power Distribution (SSEPD), is the host Distribution Network Operator (DNO). Unusually for a LCN Fund project, the project is coordinated by a Third Party Lead Supplier, EA Technology. The other project partners are Northern Powergrid (DNO partner), Nissan (EV supplier), Fleetdrive Electric (EV rental programme management) and Zero Carbon Futures (charging point network developer). Further support to the project has been provided via subcontractors, which include the University of Manchester (network modelling and analysis), De Montfort University (socio-economic data gathering and analysis), Ricardo UK Ltd (independent review at 6 month intervals), Automotive Comms (media relations), and Creative Concern (website and publicity material).

The purpose of the My Electric Avenue project is twofold:

- **Innovation 1 (commercial): Novel commercial arrangement**

The project is delivered by a third party innovation technology provider (EA Technology), with the DNO (SSEPD) ensuring the requirements of the LCN Fund and other obligations are met.

- **Innovation 2 (technical): New Technology trials**

A trial of EA Technology's Esprit technology for monitoring and controlling the supply of electricity to EVs connected to distribution networks.

This three-year project started in January 2013 and is due to complete in December 2015. Further information on the project can be found in the Full Submission Proforma, Ofgem's letter on the Project Direction and the Management and Delivery document⁵. A summary of the Task Structure is provided in Appendix 1, and an overview of the project deliverables is provided in Appendix 2.

Ricardo's role in this project is to act as the Independent Reviewer, conducting periodic 6-monthly reviews of the project and the technology. The review covers the following separate and distinct elements:

³ This project was submitted to Ofgem's Tier 2 Low Carbon Network (LCN) Fund as 'Innovation-squared: managing unconstrained EV connections' (I²EV) but was rebranded as 'My Electric Avenue' in early 2013 to improve public acceptance. The formal title "I²EV" is used for contractual and Ofgem reporting purpose.

⁴ Information on the Low Carbon Networks Fund is available on Ofgem's website: <http://www.ofgem.gov.uk/Networks/ElecDist/lcnf/Pages/lcnf.aspx> [Accessed 17 July 2013]

⁵ All of these documents are available to download from the My Electric Avenue website: <http://myelectricavenue.info/project-library> [Accessed 17 July 2013]

- **Commercial/Business**

- Review the project as it progresses, evaluating the effectiveness of the commercial and operational structure within the project team, including interactions between project partners;
- Provide recommendations (if required) on improving processes and methodology to increase effectiveness and efficiencies, maximising value for money and ensuring an unbiased outcome.

- **Technical**

- Monitor the trials underway, evaluating the:
 - Effectiveness of the methodology to undertake the trials;
 - Quality of the data being generated;
 - Validity of the analysis methods being utilised.
- Provide recommendations (if required) of improvements to processes and methodology to increase effectiveness and efficiencies to maximise value for money and ensure an unbiased outcome.

The Executive Summaries of the Independent Review reports are incorporated into the reports of the project's Successful Delivery Reward Criteria 9.4.

This report is the sixth and final periodic 6-monthly Independent Review Report covering the period from July to November 2015 (inclusive). The duration of this review was reduced from 6 months to 5 months to allow time for EA Technology and SSEPD to prepare their response to the M36 Independent Review prior to completing the project on 31 December 2015.

The Independent Review is based upon key documents delivered to Ricardo prior to or for the purpose of the Review, and has been augmented with formal and informal discussions during project meetings and conference calls.

Ricardo has used RAG indicators (Red/Amber/Green) in this Review Report to provide a quick, visual key of the reviewers' subjective opinion on the project and technology (see Table 1). A further explanation is provided in Appendix 3.

Table 1: Explanation of RAG indicators

RAG Indicator	Explanation
Green	<ul style="list-style-type: none"> • The project is delivering to plan (time, quality, budget) • There are no major issues • All the objectives have been met • The deliverables are of high quality
Amber	<ul style="list-style-type: none"> • The project is at risk of not delivering to plan (time, quality, budget) • There are issues / risks that will impact the project if not fixed • The objectives have been partially met • The deliverables are of adequate quality
Red	<ul style="list-style-type: none"> • The project is not delivering to plan (time, quality, budget) • There are issues / risks that are impacting the project right now • The objectives have not been met • The deliverables are of poor quality

2 SCOPE OF THIS INDEPENDENT REVIEW

The scope of this Independent Review concerns project activities conducted during M31 – M35. The timing of the M36 Independent Review was changed from December 2015 to November 2015 to allow time for EA Technology and SSEPD to prepare their response to the M36 Independent Review (SDRC 9.4.1.6) prior to completing the project on 31 December 2015.

During this reporting period from July 2015 to November 2015 the project focused upon:

- **Technical Trial**⁶
 - Completing the Esprit Technical Trial
 - Continuing to manage the relationships with the Technical Trial participants
 - Decommissioning the Esprit system
 - Return of EVs at end of lease
 - Conducting final questionnaires and interviews to complete Task 6 by De Montfort University
 - Completing SDRC 9.6: An assessment of the public acceptance of Demand Side Response of EV charging using Esprit
 - Completion of internal deliverable Work Activity 5 from Task 7 ("ESPRIT-Enabled Deterministic Impact Studies" – Report for Deliverables 5.1 and 5.2) by University of Manchester
 - Analysis of data collected from Esprit Technical Trial, and compilation of various reports to support SDRC 9.8
 - Preparing draft report for SDRC 9.8: An assessment of how much headroom an Esprit type solution would yield
- **Social Trial**
 - Completing the Social Trial
 - Return of EVs at end of lease
- **Project Management**
 - Ongoing effective project management and coordination of project partner activities
 - Finally receiving approval from Ofgem for the Change Request to Project Direction
 - Preparation of final dissemination activities, including a Finale Event in London on 3 December 2015
 - Completing the final project reports
- **Novel Commercial Arrangement**
 - Completing SDRC 9.2 & 9.3
 - Updating the Principal Contract Template (SDRC 9.2.3)

⁶ A review of the Esprit technology and its performance against competition has not been included in this Independent Review.

The Plugged-In Party planned for September 2015 in South Shields was cancelled due to lack of response to attend.

A summary of the participation of the project partners and subcontractors during the sixth six-month period is provided in Table 4 below. A description of the Tasks is provided in Appendix 1.

The scope of the M36 Independent Review also considers how the MEA project team has responded to recommendations made by the Reviewers in the previous reporting. For example, in the M30 Review the Reviewers made the following recommendations:

- Ensure appropriate peer review processes are followed in all activities related to handling and analysing the data from the Technical and Social Trials
- Prepare a contingency plan for the decommissioning process
- Ofgem must make a decision regarding the Change Request to the Project Direction by 31 August 2015
- Ensure all published reports include appropriate context information about the My Electric Avenue project
- Ensure all results drawn from project data are appropriately referenced and labelled
- Ask a colleague to peer review a report prior to approval
- Ensure the data, database and associated data tools have been suitably documented prior to archiving
- Consider how project dissemination activities can also be used to gather information

In the M30 Independent Review the Reviewers specifically requested these items to be included in the M36 Independent Review:

- SDRC 9.2.2 – Review of the contract put in place between SSEPD and EA Technology
- Draft SDRC 9.2.3 – Updated Principal Contract Template
- SDRC 9.3.1 – Project Processes Report, including templates, meeting records and evaluation of collaboration between SSEPD and Northern Powergrid with a third party interface
- SDRC 9.3.2 – Framework for updating policies and procedures at SSEPD, using suggestions identified during the project
- SDRC 9.3.3 – Assessment of DNO Project Management Effort compared to previous innovation projects
- SDRC 9.6.1 – Findings from socio-economic analysis on public reaction to the Esprit technology
- SDRC 9.8.1 – Modelling to assess additional thermal and voltage headroom
- SDRC 9.8.2 – Potential cost and carbon emission savings⁷

⁷ SDRC 9.8.1 and SDRC 9.8.2 are due for submission on 30 November 2015. Therefore, a draft version of SDRC 9.8 has been reviewed rather than the completed, approved and submitted version

- Evidence of successful completion of decommissioning from the Technical Trial (Task 4)
- Internal Project Deliverable Task 7 D5.1 - Combined Report on scenario-based deterministic impact studies on validated and representative LV networks considering the technology, and on the economic and environmental benefits from adopting the technology
- Estimate of the typical and maximum thermal capacity gain from using the Esprit system to control demand

Other items requested for inclusion in the M36 Review are:

- Learning Log
- Comments on the extent to which third party delivery accelerates deployment of LCN Fund projects will be provided in the final Independent Review
- Dissemination activities
- Contingency plans related to decommissioning, should a Technical Trial participant not respond to the MEA team's communication about removing the ICBs and charging points
- Evidence of peer review of project results

The Independent Review is based on documentation submitted by EA Technology, information obtained from participation in the monthly project partner audio meetings and face-to-face project partner review meetings, additional documentation published on the project website, and the M36 Independent Review meeting.

EA Technology have submitted 25 documents for the Month 36 Independent Review, which are listed in Table 2 below. The Reviewers' commentary on these documents is provided in Appendix 5.

In addition to the documents submitted directly by EA Technology, Ricardo downloaded two documents from the project website, and has included these documents in the M36 Independent Review (see Table 3). The Meeting Minutes from the monthly project partner audio meetings held during this reporting period have also been considered in the M36 Independent Review.

A review meeting with EA Technology was held on Wednesday 25 November 2015 at Ricardo Midlands Technical Centre near Leamington Spa. The meeting attendees were be Julian Dunn and Jane Patterson from Ricardo, and Tim Butler and James Cross from EA Technology.

At the time of this Independent Review, EA Technology were still preparing the Esprit White Paper and My Electric Avenue Closedown report. Therefore, these documents have not been included in this Independent Review.

Table 2: Documents supplied by EA Technology to Ricardo for the M36 Independent Review

Doc Number	Document Title	Document Filename	Deliverable Reference	(Lead) Author Organisation	Version	Issue Date	Purpose	Public Domain?
#1	MEMO – Summary of project outputs for the Month 36 Independent Review	<i>MEA 36 Month Independent Review Memo.docx</i>	-	EA Technology	-	5 November 2015	For Review	N
SDRC 9.2 & 9.3 Report								
#2	An assessment of third part delivery of a low carbon innovation project	<i>86003_R_SDRG_9.2_9.3 Issue v2.3 EATL Final.pdf</i>	SDRC 9.2 & 9.3	EA Technology	2.3	October 2015	For Review	N
#3	Principal Control Template (Revised)	<i>86003_R_SDRG 9.2.3 - Principal Contract Template - Issue 2.1.pdf</i>	SDRC 9.2.3	EA Technology	2.1	21 October 2015	For Review	N
SDRC 9.6 Report								
#4	SDRC 9.6: An assessment of the public acceptance of Demand Side Response of EV charging using Esprit	<i>My Electric Avenue (I2EV) SDRC 9.6 Issue 2.2.pdf</i>	SDRC 9.6	De Montfort University	2	20 October 2015	For Review	Y
SDRC 9.8 Report and input documents								
#5	An assessment of how much headroom an Esprit type solution would yield	<i>86002_7_R_SDRG 9_8 Draft 1.0.pdf</i>	SDRC 9.8	EA Technology	Draft 1.0	6 November 2015	For Review	N
#6	Work Activity 1 “Evaluation of the initial trial” – Report for Deliverables 1.1, 1.2, and 1.3	<i>UoM-EA-Technology_MEA_Deliverable1.1-1.3v01.pdf</i>	Internal	University of Manchester	1	28 June 2014	For Information	N
#7	Work Activity 2 “Low Voltage Networks” – Report for Deliverables 2.1, 2.2, and 2.3	<i>UoM-EA-Technology_MEA_Deliverable2.1-2.3v03.pdf</i>	Internal	University of Manchester	2	25 August 2014	For Information	N

Doc Number	Document Title	Document Filename	Deliverable Reference	(Lead) Author Organisation	Version	Issue Date	Purpose	Public Domain?
#8	Work Activity 3 "Model Validation and Data Analysis" – Report for Deliverables 3.1, 3.2, 3.3 and 3.4	<i>UoM-EA-Technology_MEA_Deliverable3.1-3.4v05.pdf</i>	Internal	University of Manchester	5	19 February 2015	For Information	N
#9	Work Activity 4 "Business as Usual Deterministic Impact Studies" – Report for Deliverables 4.1 and 4.2	<i>UoM-EA-Technology_MEA_Deliverable4.1-4.2v03.pdf</i>	Internal	University of Manchester	3	2 June 2015	For Information	N
#10	Work Activity 5 "ESPRIT-Enabled Deterministic Impact Studies" – Report for Deliverables 5.1 and 5.2	<i>UoM-EA-Technology_MEA_Deliverable5.1-5.2v04.pdf</i>	Internal	University of Manchester	4	30 September 2015	For Information	N
#11	Smart Variant	<i>EspritSolutionTemplate.pdf</i>	-	EA Technology	-	-	For Information	N
#12	Evaluation of Power Line Carrier communication for direct control of electric vehicle charging	<i>PLC Communication Reliability Report.pdf</i>	-	EA Technology	1	20 October 2015	For Information	N
#13	An Assessment of 'Esprit' Integration	<i>86002_8_R_SDRC 9.7 Issue 2.pdf</i>	SDRC 9.7.1	EA Technology	2	15 June 2015	For Information	Y
#14	SDRC 9.7.1: Impact of Esprit on Cable Thermal Ratings	<i>86002_8_R_Cable Thermal Rating SDRC 9.7 Issue 4.pdf</i>	(SDRC 9.7.1 – Supporting Documentation)	EA Technology	4	26 June 2015	For Information	Y
#15	SDRC 9.7.1 Voltage Variance: the Impact of Electric Vehicles	<i>86002_8_R_Flicker Analysis SDRC 9.7 Issue 4.pdf</i>	(SDRC 9.7.1 – Supporting Documentation)	EA Technology	4	26 June 2015	For Information	Y
#16	SDRC 9.7.1 Impact of Esprit on Heat Pumps – Supporting Documentation	<i>86002_8_R_HeatPumpImpactEsprit_Issue 2 CONFIDENTIAL.pdf</i>	(SDRC 9.7.1 – Supporting Documentation)	EA Technology	2	26 June 2015	For Information	Y

Doc Number	Document Title	Document Filename	Deliverable Reference	(Lead) Author Organisation	Version	Issue Date	Purpose	Public Domain?
Evidence of successful decommissioning								
#17	Decommissioning Schedule	<i>Decommissioning Schedule 4-Nov-2015.xlsx</i>	-	EA Technology	-	4 November 2015	For Review	N
#18	Decommissioning Information Sheet	<i>86002_4_ICB Decommissioning Audit Sheet_Main_v2.xlsx</i>	-	EA Technology	-	28 October 2015	For Review	N
#19	14631 Audit at EATL	<i>14631 Audit at EATL.jpg</i>	-	-	-	-	For Review	N
#20	ICB Removed	<i>ICB Removed.jpg</i>	-	-	-	-	For Review	N
#21	Monitoring Controller Removed	<i>MC Removed.jpg</i>	-	-	-	-	For Review	N
Learning Log								
#22	My Electric Avenue (I²EV) Learning Log	<i>I2EV MEA Combined Learning Log 2015 v 0_7.xlsx</i>	-	EA Technology	-	5 November 2015	For Review	N
Approved Change Request to the Project Direction								
#23	Change Request to Project Direction v1.10	<i>My Electric Avenue (I2EV) Project Direction Change Request Issue 4.3.pdf</i>	-	EA Technology	4.3	July 2015	For Information	N
#24	LETTER – Low Carbon Networks (LCN) Fund – approval of requested amendments ...	<i>I2EV Change request decision letter_July2015.pdf</i>	-	Ofgem		8 July 2015	For Information	N
Project Deliverable Map								
#25	MEA - Deliverable Map	<i>MEA - Deliverable Map 27_10_15 - A3.pub</i>	-	EA Technology	-	27 October 2015	For Information	N

Table 3: Additional documents considered by Ricardo during the M36 Independent Review

Document Number	Document Title	Deliverable Reference	Author Organisation	Version	Issue Date	Public Domain?
#26	Month 30 Independent Review Response	SDRC 9.4.1	EA Technology	1.1	6 July 2015	Y
#27	Top 10 tips for managing electric vehicle update	-	EA Technology	0.2	13 November 2015	Y

Table 4: Participation of Project Partners and Subcontractors during this Reporting Period

Project Partners / Subcontractors	Tasks												Comments on key activities
	0	1	2	3	4	5	6	7	8	9	10	11	
1 SCOTTISH AND SOUTHERN ELECTRIC POWER DISTRIBUTION PLC	✓	-	✓	-	✓	✓	-	-	-	✓	✓	✓	Supporting EA Technology with end-of-project activities Completion of SDRC 9.2 & 9.3 Supporting decommissioning of Esprit technology
2 EA TECHNOLOGY LIMITED	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Programme management and consortium coordination Monitoring and analysing data from Technical Trial clusters Project marketing and dissemination Managing Esprit decommissioning Continuing participant liaison activities
3a NISSAN MOTOR LIMITED GB	-	-	-	-	✓	-	-	-	-	-	-	-	
3b NISSAN INTERNATIONAL SA	-	-	-	-	-	✓	-	-	-	-	-	-	Providing access to the Nissan LEAF Advanced Processing Interface (API) for data recording
4 NORTHERN POWERGRID HOLDINGS	-	-	-	-	✓	-	-	-	-	-	-	✓	Continued support regarding Technical Trial clusters in Northern Powergrid region Supporting decommissioning of Esprit technology
5 ZERO CARBON FUTURES	-	-	✓	-	✓	-	-	-	-	-	✓	✓	Managing relationships with the trial participants, and responding to issues with the Esprit technology and EVs Overseeing decommissioning of Esprit technology from participant properties Continuing participant liaison activities
6 FLEETDRIVE MANAGEMENT LTD	-	-	✓	-	✓	-	-	-	-	-	✓	✓	Managing "end of lease" arrangements for Technical and Social Trial participants Continuing participant liaison activities
7 PROMOTE DESIGN & MARKETING LIMITED / AUTOMOTIVE COMMS	-	-	-	-	-	-	-	-	-	-	✓	✓	Arrangement and coordination of press releases and media events

Project Partners / Subcontractors	Tasks											Comments on key activities	
	0	1	2	3	4	5	6	7	8	9	10		11
8 DE MONTFORT UNIVERSITY	-	-	-	-	-	-	✓	-	-	-	-	✓	Issuing final questionnaires to trial participants for both Technical and Social Trials Ensuring questionnaires have been returned Continuing face-to-face interviews with Technical Trial participants Regular progress meetings with EA Technology Completing SDRC 9.6
9 THE UNIVERSITY OF MANCHESTER	-	-	-	-	-	-	-	✓	-	-	-	✓	Completion of UoM Work Activities 5 Supporting preparing of SDRC 9.8
10 RICARDO UK LIMITED	-	-	-	-	-	-	-	-	-	✓	-	✓	M30 & M36 Independent Reviews
11 ANDtr	-	-	-	-	✓	-	-	-	-	-	-	✓	Supporting decommissioning of Esprit technology
12 CREATIVE CONCERN	-	-	-	-	-	-	-	-	-	-	✓	-	Project marketing, including website, flyers and other promotional material

Notes:

- Task 1 has effectively been superseded by other project activities. However, during the M36 Review meeting EA Technology shared the report from the Bramley Trial, which was not included in previous reviews.
- According to the original project plan, Task 2 should have finished once recruitment for the Technical and Social Trials was completed. However, the project team have found that customer engagement has continued throughout the project to ensure that the good relationships with the trial participants are maintained.

The Esprit system was supplied to the My Electric Avenue project by EA Technology Development, a separate division of EA Technology. EA Technology Development sourced components and hardware for the Esprit system from ANDtr. The development of the Esprit system is not part of the My Electric Avenue project.

3 OVERALL ASSESSMENT

What is the reviewers' overall assessment of the project so far?

Excellent

The My Electric Avenue project has been successful. The project has been delivered using a novel commercial arrangement. EA Technology has been the third party innovation technology provider and SSEPD the lead DNO, ensuring the requirements of the LCN Fund and other obligations were met. The project has completed a trial of EA Technology's Esprit technology for monitoring and controlling the supply of electricity to EVs connected to distribution networks.

EA Technology, in their role as Third Party Lead Supplier, have worked professionally and diligently in their role as project coordinator throughout the duration of the project. They have successfully managed a complex arrangement of project partners and subcontractors.

Teamwork within the project consortium has been excellent. The project partners and subcontractors have demonstrated strong commitment to the successful delivery of the project. Enthusiasm and morale amongst the project team has remained high throughout the project.

The My Electric Avenue team responded well to the various challenges encountered during the project. The changes imposed by Ofgem in the Project Direction led to innovations in the recruitment approach, which yielded very high levels of public interest in the project. The agility of the focused project team enabled them to respond quickly to the various issues encountered with the Esprit technology. Project partners were flexible, adapting their plans to align with changes to the Technical Trial caused by the issues with Esprit.

Customer engagement has been very strong, as reported consistently in previous Independent Reviews. EA Technology, Fleetdrive Electric, and Zero Carbon Futures have demonstrated good management of the relationships with the Technical and Social Trials from recruitment and initial roll-out through to trial decommissioning. Evidence of the success of this customer engagement can be gained from SDRC 9.6 and the videos of participants in the South Shields clusters⁸.

Dissemination activities have been numerous. The project team have employed a range of media options for raising public awareness about the project, such as good use of the project website, press releases, email newsletters, social media, flyers for conferences and several presentations. Technical papers have been presented at relevant national and international conferences. Webinars have been held to target specific audiences, such as the automotive industry.

Document quality control has improved during the project. The project team has continued to deliver high quality professional reports, many of which are available to download from the project website.

⁸ Available from the My Electric Avenue media library <http://myelectricavenue.info/media-library#overlay-context=faqs> [Accessed on 1 December 2015]

The My Electric Avenue project has collected a wealth of technical and social data regarding EV charging and user behaviour. This unique data set includes technical data from the electric vehicles, technical data from the monitoring of the low voltage systems and Esprit technology, and the social data concerning the experience of the Technical and Social Trial participants. It is highly likely that this data set will be valuable input for many future academic and research projects in the UK and beyond.

The MEA team has maximised the learning from the project, as evident from the additional report prepared on PLC communication and the Top 10 Tips series. Learning from My Electric Avenue will help to inform future projects seeking to develop demand side response tools.

The My Electric Avenue project has successfully proven the concept of the Esprit technology. A demand side response (DSR) tool can be used to curtail EV charging on LV networks, thus protecting these networks for thermal and voltage overload. However, the Esprit product requires further development to make it suitable for a wider commercial roll-out. It is expected that learning from My Electric Avenue will be incorporated into the next generation of Esprit or similar DSR tools.

One significant area of concern which must be addressed for future innovation projects with a novel commercial arrangement, is the high level of risk imposed on EA Technology by Ofgem via the restrictions outlined in the Project Direction. As discussed in the M12 Independent Review, this risk was initially financial. Following the early recruitment success of trial participants, EA Technology wisely decided to accelerate the establishment of the initial clusters for the Technical Trial, and to begin the roll-out of electric vehicles to Technical and Social Trial participants. This ensured the continued participation of customers who successfully met the trial criteria. Whilst this demonstrated the commitment of the Third Party Lead Supplier to the success of the project, it placed EA Technology at severe financial risk, especially considering their company size and annual turnover. This was exasperated by the debate regarding interpretation of cluster establishment. Such an approach by Ofgem is likely to deter other SMEs from pursuing the role of Third Party Lead Supplier for future LCN Fund projects.

The restrictions imposed by Ofgem also added to the technology risk of the project. The purpose of the project was to trial a novel, prototype technology. Successful innovation requires careful management of the technical, as well as the commercial, risks. Phasing the roll-out of the technology is a good technology risk mitigation measure. The original plan for the My Electric Avenue project was to establish 1-3 clusters prior to recruiting the remainder. If this approach had been followed, the project would have begun to generate technical data earlier, and may have produced more data overall. Also, it is likely that many of the issues encountered with the Esprit technology would have been identified earlier, and would have been less costly and time consuming to fix.

4 PROGRESS TOWARDS OBJECTIVES

The overall project objectives, as stated in the Management & Delivery document, are divided into two categories – commercial and technical.

The **commercial** objectives of the I²EV project are to:

- Demonstrate delivery of a LCN Fund project by a non-DNO on behalf of a DNO
- Develop a novel commercial arrangement
- Enable all procurement related to the project activity to be managed by a non-DNO
- Evaluate the extent to which third party delivery accelerates deployment of LCN Fund projects

The **technical** objectives of the I²EV project are to:

- Learn customer driving and charging habits and the implications for control via the Technology
- Develop and trial the equipment to ascertain its ease of installation
- Develop the integration of the Technology into the EV charging points including how existing intelligence and attributes in charging points can be harnessed to reduce the cost and improve the performance
- Evaluate the range of networks where it can operate successfully and identify any type of networks that are inappropriate
- Evaluate how often switch off routines are likely to be initiated from real life trials and extrapolation via modelling using the results
- Evaluate the most appropriate length of time to switch off charging and how to cycle switches with references for battery management and customer preference and habits
- From the results and extrapolation via modelling, estimate the typical and maximum thermal capacity gained

The objectives for this reporting period (July 2015 to November 2015) were to:

- **Technical**
 - Deliver:
 - SDRC 9.4.1.5 – M30 Independent Review
 - SDRC 9.6 – An assessment of the public acceptance of Demand Side Response of EV charging using Esprit
 - Internal project deliverables Task 7 D5.1 and D5.2 (University of Manchester)
 - Begin to prepare SDRC 9.8 – An assessment of how much headroom an Esprit type solution would yield
 - Continue to deliver data collection reports to ensure data has been recorded and retrieved from CARWINGS and iHost, and to report data analysis
 - Decommission of Esprit from the Technical Trial clusters

- Complete collection of social data from the Technical Trial participants via questionnaires, interviews and focus groups (Task 6, De Montfort University)
- **Commercial**
 - Deliver SDRC 9.2 & 9.3
- **Project Management**
 - Continue the regular project meetings and reviews, as outlined in the Management and Delivery Document

Have the key objectives for the period been achieved?

Yes

Has the project made satisfactory progress towards meeting the overall project objectives?

Yes

The My Electric Avenue project has successfully demonstrated delivery of a LCN Fund project by a non-DNO on behalf of a DNO. SDRC 9.2 & 9.3 report documents the learning from this novel commercial arrangement, and provides recommendations on how such a commercial arrangement could be improved for future innovation projects. Ofgem, DNOs and potential third party lead suppliers should carefully read SDRC 9.2 & 9.3 prior to committing to a future project. Ofgem should consider how SSEPD and EA Technology's recommendations could be implemented in future projects.

The My Electric Avenue project has successfully demonstrated Demand Side Response (DSR) control of EV charging using the prototype Esprit technology. The reports for SDRC 9.6 and SDRC 9.8 capture to social and technical learning from the Technical and Social Trials, and the implications for future generations of the technology.

It is disappointing that the duration of the Esprit technology trial was less than planned due to various issues encountered with the technology at the beginning of the Technical Trial. Future innovation projects using prototype technology should be designed with suitable mitigating measures to control the technology risk. For example, rolling out the technology in phases rather than at the same time, as proposed in the original I²EV bid submission.

However, the My Electric Avenue team have endeavoured to maximise the learning from the Esprit technology trial and wider project activities, as demonstrated in the excellent reports submitted for this Independent Review.

5 PROGRESS AGAINST WORK PLAN

Has each Task made satisfactory progress against the Plan of Works?

Task 0: Novel Commercial Arrangement

Yes

Completion of SDRC 9.2 & 9.3

Task 1: Initial Background

Completed

It was thought that Task 1 has been superseded by other project tasks. However, during the M36 Review Meeting, EA Technology shared a report from the previous Bramley trial. The report is effectively the output from Task 1, although it was never submitted for review in an Independent Review.

Task 2: Customer Engagement

Yes

Decommissioning is nearly complete

Task 3: Integration of the Technology with charging points

Completed

This task was completed in the previous reporting period.

Task 4: Establishment of Customer / Cluster Trials

Yes

The Technical and Social Trials were completed during this reporting period. Esprit decommissioning is nearly completed. Nissan LEAFs have been returned at the end of the lease period.

Task 5: Monitoring first trials

Yes

The project team continued to collect technical data from the Technical and Social Trials via Nissan CARWINGS and the iHost until the end of the Technical and Social Trials.

Results from analysing this data are presented in SDRC 9.8.

Task 6: Trial Participant Interviews

Yes

Final questionnaires completed

SDRC 9.6 completed

Task 7: Modelling

Yes

Task 7 Deliverables 5.1 and 5.2 completed

A draft version of SDRC 9.8 has been completed

Task 8: Consultation with EV manufacturers: cycle times

Completed

This task was completed in previous reporting periods.

Task 9: Project and Regulatory recommendations and implementation

No
comment

This task concerns the periodic 6-monthly Independent Reviews, which is the subject of this report.

Task 10: Dissemination

Yes

Ofgem's approval of the Change Request to the Project Direction in July 2015 has enabled the team to plan a series of dissemination events to mark the end of the trial and the project, such as:

- Finale Event scheduled for 3 December 2015 in London
- Preparing newsletter and video for trial participants
- Attending LCNI Conference, 24-26 November 2015

More information on dissemination activities is provided in Chapter 9.

Task 11: Project Management

Yes

EA Technology have continued to hold regular project progress meetings with SSEPD, project partners and subcontractors, as outlined in the Management and Delivery Documents.

Have planned SDRCs been achieved for this reporting period?

Yes

Have the other planned project milestones and deliverables been achieved for this reporting period?

Yes

The SDRCs and internal deliverables planned for this period have been delivered (see Chapter 7). The remaining SDRCs are expected to be completed on time.

Decommissioning has progressed well, and is expected to finish soon.

6 RESPONSE TO PREVIOUS RECOMMENDATIONS

Has the project implemented the recommendations from the previous Independent Review?

Mostly

EA Technology's response to the recommendations made during the M30 Independent Review are documented in "**30 Month Independent Review Response**". In this report, EA Technology confirmed their intention to implement these recommendations within this reporting period:

- 1) **Ensure appropriate peer review processes are followed in all activities related to handling and analysing the data from the Technical and Social Trials**

The MEA team will ensure project deliverables undergo peer reviews from EA Technology staff outside of the MEA team prior to publication.

- 2) **Prepare a contingency plan for the decommissioning process**

The MEA team have begun drafting documentation to support a contingency plan. This work will continue and is expected to be completed in time for decommissioning.

- 3) **Ofgem must make a decision regarding the Change Request to the Project Direction by 31 August 2015 to ensure the MEA team has sufficient time remaining in the project to utilise the remaining project funds**

The MEA team will continue to request updates from SSEPD on progress with regards to the Change Request.

The peer review was described in the memo "Summary of project outputs for the Month 36 Independent Review" (Document #1). The document history in each SDRC records several of the peer review steps. During the M36 Review Meeting, EA Technology showed the SharePoint version history for SDRC 9.8. This version history shows that several EA Technology employees have worked on the document, include one who incorporated feedback from another colleague who was not part of the My Electric Avenue project.

The memo "Summary of project outputs for the Month 36 Independent Review" (Document #1) implies a contingency plan for decommissioning was prepared. During the M36 Review Meeting EA Technology shared a project memo prepared by ZCF, which documented the agreed decommissioning process. This process included several contingency steps to follow should the decommissioning not progress as planned. It is clear from the discussions with EA Technology that the decommissioning process was carefully considered by EA Technology and ZCF, with several meetings held to discuss and plan for the activity. Lois Warne and her team at ZCF have previous experience of decommissioning technology at the end of a technology trial, which was valuable for preparing the decommissioning process for Esprit. Although the MEA team did consider contingency measures, it appears that a contingency plan for the decommissioning process was not formally documented.

As noted by SSEPD in the Response Report, Ofgem approved the Change Request in early July 2015 (see Document #24). Therefore, this action is closed.

Other recommendations made by Ricardo during the M30 Independent Review include:

- Ensure all published reports include appropriate context information about the My Electric Avenue project
- Ensure all results drawn from project data are appropriately referenced and labelled
- Ask a colleague to peer review a report prior to approval
- Ensure the data, database and associated data tools have been suitably documented prior to archiving
- Consider how project dissemination activities can also be used to gather information

The SDRCs scheduled for this reporting period, SDRC 9.2 & 9.3, SDRC 9.6 and SDRC 9.8 do contain background information about the My Electric Avenue project, and do reference other reports published by the project. The document version histories record various phases of internal review.

No information was provided for this review about the data collected, database and associated data tools. During the M36 Review Meeting EA Technology confirmed that archiving of the data, database and data analysis tools is planned for December 2015. Data collection from some remaining Nissan LEAFs is still ongoing. The Independent Reviewers are unable to comment on whether the data and data tools will suitably documented prior to archiving.

A Finale Event is scheduled for 3 December 2015 in London. This should be an excellent opportunity for disseminating project learning, and for gaining feedback from a wider audience.

7 INDEPENDENT REVIEW OF THE SUCCESSFUL DELIVERY REWARD CRITERIA AND OTHER DELIVERABLES

A full list of the project's Successful Delivery Reward Criteria (SDRC) is provided in Appendix 2. Listed below are the SDRCs completed in this reporting period (January – June 2015), along with reviewer "traffic light" ranking. Further comments on these SDRCs can be found in Appendix 5.

SDRC 9.4.1.5a	Month 30 Independent Review Report	No comment
No comment		
SDRC 9.4.1.5b	Report in response to Month 30 Independent Review	No comment
No comment		
SDRC 9.2 & 9.3	An Assessment of Third Party Delivery of a Low Carbon Innovation Project	Excellent
<p>A high quality, professional document capturing the learning from the novel commercial arrangement. This will be a useful, insightful and valuable document for Ofgem, DNOs and potential 3rd Party Lead Suppliers.</p>		
Further commentary on SDRC 9.2 & 9.3 is provided in Appendix 5A.		
SDRC 9.2.3	Principal Contract Templated (Revised)	Adequate
<p>It is good that a template for the Principal Contract has been included as one of the project deliverables. This template would benefit from another round of editing focused on making the document more consistent and user friendly. This, in turn, would make the template easier to adapt for future projects.</p>		
Further commentary on SDRC 9.2.3 is provided in Appendix 5A.		
SDRC 9.6	An Assessment of the Public Acceptance of Demand Side Response of EV Charging using Esprit	Good
<p>A professional, well-written scientific report on the social aspects of the MEA trials, prepared by De Montfort University with support from EA Technology. The "Summary of Findings" boxes are usefully for quickly understanding the key results from the participant questionnaires and interviews.</p>		
Further commentary on SDRC 9.6 is provided in Appendix 5B.		

**SDRC 9.8
(Draft)**

**An assessment of how much headroom an Esprit
type solution would yield**

Good

A complete draft of this report was provided for the M36 Independent Review. This has the potential to be an excellent report. However, the Independent Reviewers identified a couple of errors in the Well-to-Wheels Carbon Savings analysis reported in Section 8. This should be corrected for the final version.

Also, Section 6 is difficult to comprehend, which may prevent some readers from reading the complete report.

Further commentary on SDRC 9.8 is provided in Appendix 5C.

8 IMPLEMENTATION OF THE PROJECT

Has the project management been performed as required?

Yes

EA Technology continue to manage the project well, with good participation from all project partners and subcontractors.

Has the collaboration between project partners and sub-contractors been effective?

Yes

The working relationships between the main project partners and subcontracts continues to be good.

Is there evidence of underperforming project partners or sub-contractors, lack of commitment or change in interest?

No

There is no evidence of underperforming project partners in the documentation supplied for this review.

9 DISSEMINATION OF PROJECT LEARNING

Have the project partners adequately publicised the project to raise awareness of the project with the general public?

Yes

Have the project partners adequately disseminated results and learning from the project?

Yes

Gill Nowell of EA Technology provided a list of dissemination activities for the period July to December 2015 by email. The dissemination activities for this reporting period are listed in the table on the following page.

Table 5: List of dissemination activities

Item	Title	Location	Date (2015)	MEA activity	Audience	MEA message	Coverage
Event	Cenex LCV2015	Millbrook Proving Ground	9-10 Sep 2015	Presentation NAA stand exhibitor	Low carbon vehicle sector	Latest results reveal impact of EVs on some networks	<u>Interviewed by Robert Llewellyn</u> Press release via Newspress and MEA media contacts Twitter LinkedIn
Event	IET	Inglewood Manor	9 Sep 2015	Presentation	IET members	Latest results reveal impact of EVs on some networks	c. 20
Event	ENA EV	London	19 Oct 2015	Presentation	EV sector / supply chain / OLEV / BEAMA, DNOs	Latest results reveal impact of EVs on some networks	20 stakeholders
Event	LCNI	Liverpool	24-26 Nov 2015	Workshop presentation MEA presence on EA Technology stand	DNOs Energy sector Ofgem DECC, OLEV	Final results – commercial and technical	c. 3,000 footfall
Event	MEA Turning the Corner	IMechE, London	3 Dec 2015	Presentation of commercial and technical learning	130 delegates spanning utilities, automotive, Government, trial participants, Ofgem	Final dissemination of learning Launch of Legacy Initiative	Press release Twitter (ongoing campaign) LinkedIn (ongoing campaign)
SDRC 9.6	Assessment of public acceptance of DSR using Esprit	-	End Nov	Dissemination of learning	Utilities, energy sector, Government, automotive	DSR of EVs generally accepted (remote control charging)	500 MEA contacts – email Twitter LinkedIn MEA website MEA finale event

Item	Title	Location	Date (2015)	MEA activity	Audience	MEA message	Coverage
SDRC 9.7	Assessment of Esprit Integration	-	End Nov	Dissemination of learning	Utilities, energy sector, Government, automotive	Assessment of integration into charging points and suitable cycle times	500 MEA contacts – email Twitter LinkedIn MEA website MEA finale event
SDRC 9.8	Manchester outputs	-	End Nov	Dissemination of learning	Utilities, energy sector, Government, automotive	EV impact on network types	500 MEA contacts – email Twitter LinkedIn MEA website MEA finale event
Award	Northern Automotive Innovation Award	Knutsford	12 Nov 2015	Award presentation	Automotive	Esprit innovation has delivered results through MEA project	Press release to Newspress, MEA media contacts Twitter LinkedIn
Top 10 Tips	Managing EV uptake	-	13 Nov 2015	Dissemination of learning	Utilities, energy, automotive, Government	MEA offers insight into managing EV uptake and has a proven solution	MEA website Twitter LinkedIn
Meetings (various)	OLEV, SMMT, Ofgem	London	Sept-Dec 2015	Dissemination of learning	Utilities, energy, automotive, Government		

10 HIGHLIGHTED STRENGTHS

EA Technology, as Third Party Leader Supplier for the My Electric Avenue project, has consistently shown **strong leadership** and **good project management**. Although an innovation project of this size would be considered small by a DNO, it was significant to EA Technology, who were able to give it the high priority it required to succeed. This is one of the benefits of the novel commercial arrangement trialled during this project.

The My Electric Avenue project could not have been delivered by SSEPD and EA Technology alone. EA Technology assembled a good team of project partners and subcontractors with the **diverse range of skills and experience** required to deliver the technology trial. Northern Powergrid provided insight from another DNO, and helped install the technology. Nissan provided the electric vehicles, access to vehicle data and information on EV charging. Fleetdrive Electric managed the EV rental programme. Zero Carbon Futures provided experience of charging point network, and greatly assisted installation and decommissioning the technology, along with managing customer relationships. De Montfort University provided expertise in socio-economic data gathering and analysis. The University of Manchester provided excellent network modelling and analysis. Automotive Comms ensured good media relations, and Creative Concern provided a professional website and publicity material. These project partners and subcontractors demonstrated **excellent teamwork** throughout the 3-year project.

Unusually, two DNOs have contributed to this project. The participation of both SSEPD and NPG has greatly enhanced the project experience, range of technical trial clusters, and learning outcomes from the project. It is unlikely that this would have occurred without the novel commercial arrangement.

All project partners and subcontractors have shown their **dedication and commitment** to the success of the project, frequently going beyond what was expected. Such as, EA Technology taking on board increased financial risk by ordering and accepting delivery of some Nissan LEAFs in advance of the funding release by Ofgem to ensure that the early establishment of clusters for the Technical Trial was retained.

The project partners, especially the smaller organisations, have been **flexible and agile** when responding to various issues encountered during the project. Such as, De Montfort University revising their schedule of Task 6 activities to minimise the impact the Esprit technology, whilst ensuring EA Technology were kept aware of the risks to project learning.

A key strength of 'My Electric Avenue' has been the **project team's approach to recruitment of participants for the Technical and Social Trials**. The combination of strong project branding, website and strategic media attention with a 'bottom-up' grass-roots movement via cluster champions led to a phenomenal response from customers. This successful approach to the recruitment of potential trial participants should be noted by Ofgem, and the project learning applied to other LCNF projects as appropriate.

Throughout the project, the project team had demonstrated **good management of customer relationships**, as evident from the feedback received by DMU's interviews and focus groups (see SDRC 9.6 report). In particular, the Independent Reviewers

wish to highlight the efforts made by EA Technology, Zero Carbon Futures and Fleetdrive Electric.

Public engagement has been timely and effective, through the organisation of press releases, newsletters, social media, press days, and the project website. General awareness of the project is high.

Dissemination has been strong, with a wide range of methods used to communicate project results and learning to relevant audiences. The website is a key portal for sharing project reports. Webinars have allowed the project team to target specific groups, such as the power networks and automotive sectors. MEA presentations have been given at highly relevant conferences and events. The **Top 10 Tips series** is an excellent idea for disseminating project learning in a "bite size" format.

Project reports have been professional, completed to a high level of quality, and maintaining the strong project brand.

EA Technology have demonstrated **good understanding of the data collected**, which is evident when discussing project results with the MEA team.

The data collected will be of great value to researchers and technology developers, when it is released in anonymised form. It is unusual to have a data set that includes EV use and charging behaviour (from Nissan CARWINGS), monitoring of low voltage networks and signals to operate the technology (from Nortech's iHost Platform – see Appendix 4), and the response from trial participants (DMU questionnaires, interviews and focus groups).

11 RECOMMENDATIONS FOR IMPROVEMENTS AND ADAPTIONS TO THE WORKING PRACTICES

The My Electric Avenue project has successfully demonstrated the delivery of a LCN Fund project by a lead DNO with Third Party Lead Supplier. Many of the benefits of this approach are discussed in SDRC 9.2 & 9.3, such as the lower than expected programme management expenditure reported by SSEPD. **It would be good to encourage future LCN Fund projects to adopt a similar novel commercial arrangement in order to accelerate innovation.**

The recommendations made by SSEPD and EA Technology on how to improve the processes around the novel commercial arrangement should be noted and actioned by Ofgem (see the Executive Summary of SDRC 9.2 & 9.3). In particular, **the novel commercial arrangement must be acknowledged by Ofgem.** It is important for Ofgem to be able to communicate directly with the Third Party Lead Supplier in their role as project coordinator.

If Ofgem decide to alter the project scope via the Project Direction, the project team should be allowed time to evaluate the impact of these changes, before beginning the project. Changing scope of work may impact on the commercial, financial and technical risks of the project, and may require a revision of project budgets and resource allocations. Some project partners may wish to withdraw, if the increased financial risk is considered to be too high.

The Reviewers recommend **a thorough review of the LCN Fund reporting process by the DNO, Third Party Lead Supplier and Ofgem.** Project Progress Reports are required by Ofgem on a six monthly basis. Due to the various stages of review and approval required, SSEPD and EA Technology have recommended a two month window for preparing these Progress Reports (see SDRC 9.2 & 9.3, Section 7.4.3). This is too long. The progress reporting process needs to be streamlined, with the objective of minimising the steps so that the six-monthly progress reporting can be achieved within 2-3 weeks of the end of the reporting period.

The purpose of trialling a new technology is to identify and resolve issues. Even the best planned technology project will encounter something unexpected or surprising. Therefore, **the scope of work for a technology trial should incorporate elements from the technology development risk mitigation plan, such as the phased roll-out of the technology.** The project scope should also include sufficient flexibility, to allow the project team to quickly respond to unforeseen issues.

Data collection and analysis must be planned from the beginning. The requirements for data capture, storage and processing should be considered when preparing the scope of work. These requirements, along with the planned data collection and analysis activities should be reviewed, adapted and updated as the project progresses to ensure maximum learning is achieved.

Unusually, the My Electric Avenue project has included an Independent Review activity, to provide an independent opinion on the commercial and technical aspects of the project. The feedback and recommendations from the Independent Reviews has been valued by both EA Technology and SSEPD, as evident from their responses provided in the SDRC 9.4 reports. It may be useful for future LNC Fund projects to include Independent Review activities. However, if so, **the timing of these Independent Reviews should be linked to the periodic progress reporting,** so that the periodic reports can be included within the review pack.

The My Electric Avenue project has collected a unique data set of technical and social data related to the impact of EV charging and EV charging curtailment. Future work should include further analysis of this data to extract even more learning from the trial. **When the anonymised data is made available to the public, it should have a suitable licence to ensure that academics and researchers who use the data accredit the data to the My Electric Avenue project.**

It would be good to publish copies of the questionnaires used in the Technical and Social Trials.

The My Electric Avenue project has proved the concept for the Esprit technology. However, prior to committing to further R&D, EA Technology should consider **conducting a thorough review of the business case for Esprit**. This review should incorporate learning from the MEA project, and understanding of the requirements of the energy and automotive sectors. Pathways for achieving a suitable return on investment may also require revision.

The pace of change in the automotive sector is quicker than the pace of change in the distribution networks sector. Legislation around improving energy efficiency, reducing CO₂ emissions and improving air quality is driving vehicle manufacturers to develop alternative powertrain vehicles, such as plug-in hybrids and electric vehicles. Such plug-in vehicles will impact on our low voltage networks.

Significant change has already occurred over the duration of the My Electric Avenue project. In 2012 there were only 1,262 new registrations of pure electric vehicles in the UK, and the choice was mostly limited to the Nissan LEAF. By 2015, for the year-to-date (January to October 2015) 7,637 new EVs have already been registered, along with 15,183 plug-in hybrids. Several vehicle OEMs offer at least one plug-in vehicle model, providing a wider choice for customers. According to SMMT, there are currently over 42,000 plug-in passenger cars in use in the UK⁹. Many of these plug-in vehicles can be charged at higher power levels than the Nissan LEAFs used during the MEA trial.

Ricardo expect that over the next few years more vehicle OEMs will launch plug-in vehicle models, as part of their CO₂ reduction strategy. Local policy and incentives in cities such as London could encourage the uptake of such vehicles in regional clusters. Other new technologies, such as autonomous systems and intelligent communications, could disrupt current vehicle usage and business models. Several vehicle OEMs have already changed their brand position to "mobility solution providers". These developments will have an impact on the learning from MEA.

Given the changing nature of the automotive technology landscape, **the energy networks sector should build on the engagement with the automotive sector** begun during My Electric Avenue and similar projects. Both sectors need to understand the wider consequences of these technology changes in transport and mobility. It would also be wise for the **energy networks sector to maintain a technology watch on the automotive technology sector**, to keep up-to-date with the predicted introduction of evolutionary and revolutionary technologies.

⁹ SMMT, 2015. Registration – EVs and AFVs [online]. Available at: <http://www.smmt.co.uk/category/news-registration-evs-afvs/> [Accessed 27 November 2015]

APPENDIX 1 PROJECT TASK STRUCTURE

The 'My Electric Avenue' project consists of 12 Tasks, as described in the table below, taken from Annex 2 of the Project Direction letter from Ofgem, dated 21 December 2012, and from the Project Plan (dated Tuesday 18 June 2013). Further information on the Tasks is provided in Section 2 of the LCN Fund Full Submission Pro-forma.

Task ID	Task Title	Task Description	Start	End
Task 0	Novel commercial arrangement		2 January 2013	31 December 2015
0.1	Establish the 3rd party delivery commercial framework (yr 1)	Draft and agree the contract for a non-DNO to manage a LCN Fund Tier 2 project		
0.2	Review the commercial framework and recommend changes (yr 3)	Review the initial contract towards the end of the project and make necessary changes following the lessons learnt		
Task 1	Initial background – evaluation of initial trial		2 January 2013	28 June 2013
1.1	Evaluation of initial on-site trial	Evaluation of the initial trial of the Esprit Technology (December 2012) to improve the Technology and the plans of trials to occur as part of the I ² EV Project		
1.2	Literature survey - additional load	Literature survey of the estimates regarding additional load to be introduced from EVs and the potential for load shifting		
1.3	Literature survey - customer behaviour	Literature survey of the existing knowledge of customer behaviour with respect the use of EVs and the acceptance of direct control appliances		
Task 2	Customer engagement		2 January 2013	11 December 2014
2.1	Customer engagement plan	Develop customer engagement plan for the I ² EV Project		

Task ID	Task Title	Task Description	Start	End
2.2	Social trials	Engagement with Nissan, Charge Your Car North Ltd and Fleetdrive to approach EV owners throughout the UK with the intention of monitoring and recording location, driving and charging habits in statistically significant numbers		
2.3	Technical trials	Establishment of statistically significant clusters, relative to the individual network, to trial the Technology on multiple network types and across multiple demographics		
Task 3	Integration of the Technology with charging points		17 June 2013	30 June 2015
3.1	Technology development of Esprit			
3.2	Ongoing development of Esprit during project	Development of the Esprit Technology, integrating learning from the Project (not to be funded under LCN Fund)		
3.3	Engage with charging point manufacturers	Liaise with charging point manufacturers to discuss the Technology and the impact on their equipment		
3.4	Integrate technology with charging points	Work on integration of the Technology (Logic and Communication Systems) into Charging Points		
Task 4	Establishment of customer / cluster trial		30 September 2013	18 December 2015
4.1	Managing subsidised rental programme for fleet users	Management of the vehicles and participants in the Fleet Trials		
4.2	Managing collection and delivery of cars	Delivering and managing the Fleet Trial Participants		
4.3	Finding trial (fleet) participants and providing funding / risk of funding	Identification, discussion and engagement with Fleet Trial Participants		

Task ID	Task Title	Task Description	Start	End
4.4	EV leasing costs (fleet)	EV leasing costs (fleet)		
4.5	Engage with local network cluster(s)	Identification, discussion and engagement with local network clusters		
4.6	Assess network(s)	Assessment of the local networks around potential cluster locations to validate the suitability of the site for participation in the trial		
4.7	Install technology and charging points	Install technology and charging points		
4.8	Removal of charging points at end of trial	Removal of charging points at end of trial		
Task 5	Monitoring first trial		31 March 2014	30 November 2015
5.1	Monitor and download data	Data to be collected on a monthly basis during each trial		
5.2	Report on data (6 monthly)	Report summarising high level analysis of gathered data		
5.3	Uninstall monitoring at end of trial	Removal of any charging points as required		
Task 6	Trial participant interviews		2 January 2013	30 October 2015
6.1	Develop interview pack	Develop interview pack for social and technical trial participants		
6.2	Pre-trial interviews	Undertake pre-trial interviews		
6.3	During trial interviews	Undertake during-trial interviews		
6.4	Post-trial interviews	Undertake post-trial interviews		

Task ID	Task Title	Task Description	Start	End
6.5	Socio-economic modelling	Modelling and analysis of the data gathered as part of the social trials		
6.6	Make recommendations and report	Recommendations as to the anticipated acceptance of the Technology		
Task 7	Modelling		7 April 2014	30 November 2015
7.1	Network modelling and analysis contract	Develop a test network based on the information gathered from the trials		
7.2	Model the test network	Undertake simulation and modelling of the test network		
7.3	Extrapolate to different network types and locations	Extrapolate to different network types and locations		
7.4	Compare the results with existing work identified in literature survey	Compare the results with existing work identified in literature survey		
7.5	Estimate savings through the use of the Solution	Estimate savings that could be achieved using the Technology on wider networks		
Task 8	Consultation with EV manufacturers		1 September 2015	18 December 2015
8.1	Agree the cycle times for the Technology with OEMs	Discussion with EV manufacturers to prevent premature ageing of EV batteries as a results of charging cycles		
Task 9	Project and regulatory recommendations with implementation		1 May 2013	31 December 2015
9.1	Independent evaluation (Project and Solution)	Monitoring and evaluation of the project by an independent party		
9.2	How might the solutions be used by DNO planners as part of BAU	Make recommendations as to the ideal uptake of the Technology/solution by DNOs		

Task ID	Task Title	Task Description	Start	End
9.3	Technical framework recommendations	Identify any elements of the Project Framework that if changed, would improve the Technical development of the Project		
9.4	Commercial framework recommendations	Identify any elements of the Project Framework that if changed, would improve the Commercial development of the Project		
Task 10 Dissemination			2 January 2013	31 December 2015
10.1	Develop dissemination / comms plan	Develop the plans for Project Learning Dissemination and Communication with Stakeholders		
10.2	Implement communications plan	Implement the Communication Plan		
10.3	Reporting of SDRC outputs	Reporting of SDRC outputs		
Task 11 Project Management			2 January 2013	31 December 2015
11.1	Programme management to deliver the project	Programme management to deliver the project		
11.2	Project governance and support	Project governance and support		
11.3	DNO project review and results	DNO project review and results		

Notes:

- A revised scope of work has been proposed for Task 1, Task 6 and Task 7. **The Project Task Structure presented above may need to be revised to align with these changes in scope for Task 1, Task 6 and Task 7.**

APPENDIX 2 LIST OF SUCCESSFUL DELIVERY REWARD CRITERIA (SDRC) AND OTHER DELIVERABLES

Successful Delivery Reward Criteria (SDRC):

SDRC	Document Title	Planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
9.1 9.1.1	Learning from third party delivery of a Tier 1 LNCf project – bid submission process	28 February 2013	28 February 2013	v1 28 February 2013	EA Technology	Complete
9.2 9.2.1	Supporting Guidance for the I2EV (My Electric Avenue) Novel Commercial Arrangement	30 April 2013	30 April 2013	v1 30 April 2013	EA Technology	Complete
9.2.1 – Annex 1	Management & Delivery Document	30 April 2013	30 April 2013	v1 30 April 2013	EA Technology	Complete
9.2.1 – Annex 2	Principal Contract Template	30 April 2013	30 April 2013	v1 30 April 2013	EA Technology	Complete
9.2.1 – Annex 3	Partner / Supplier Task Order Template	30 April 2013	30 April 2013	v1 30 April 2013	EA Technology	Complete
9.2.2	Review of Novel Commercial Arrangement	30 October 2015	October 2015	v2.3	EA Technology	Complete
9.2.3	Updated Principal Contract Template	31 December 2015	21 October 2015	Issue 2.1	EA Technology	Complete
9.3 9.3.1	Project Processes Report, including templates, meeting records and evaluation of collaboration between SSEPD and Northern Powergrid with third party interface	30 October 2015			SSEPD	Complete
9.3.2	Framework for updating policies and procedures at SSEPD, using suggestions identified during the project	30 October 2015	October 2015	v2.3	SSEPD	Complete
9.3.3	Assessment of DNO Project Management Effort compared to previous innovation projects	30 October 2015			SSEPD	Complete

SDRC	Document Title	Planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status	
9.4	9.4.1.1a	Month 06 Independent Review Report	31 July 2013	-	-	Ricardo	Complete
	9.4.1.1b	Report in response to Month 06 Independent Review	31 July 2013	-	-	EA Technology	Complete
	9.4.1.2a	Month 12 Independent Review Report	31 January 2014	-	-	Ricardo	Complete
	9.4.1.2b	Report in response to Month 12 Independent Review	31 January 2014	-	-	EA Technology	Complete
	9.4.1.3a	Month 18 Independent Review Report	31 July 2014	-	-	Ricardo	Complete
	9.4.1.3b	Report in response to Month 18 Independent Review	31 July 2014	July 2014	v1.1	EA Technology	Complete
	9.4.1.4a	Month 24 Independent Review Report	31 January 2015	-	-	Ricardo	Complete
	9.4.1.4b	Report in response to Month 24 Independent Review	31 January 2015	-	-	EA Technology	Complete
	9.4.1.5a	Month 30 Independent Review Report	31 July 2015	7 July 2015	v4	Ricardo	Complete
	9.4.1.5b	Report in response to Month 30 Independent Review	31 July 2015	-	-	EA Technology	Complete
	9.4.1.6a	Month 36 Independent Review Report	31 December 2015	-	-	Ricardo	Due to complete in December 2015
	9.4.1.6b	Report in response to Month 36 Independent Review	31 December 2015	-	-	EA Technology	Due to complete in December 2015
9.5	9.5.0.1	Customer Engagement Plan for Relevant Customers	28 February 2013	29 January 2013	v5.6 1 March 2013	EA Technology	Complete

SDRC	Document Title	Planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
9.5.0.2	Data Protection Strategy (DPS)	28 February 2013	29 January 2013	v4.2 1 March 2015	EA Technology	Complete
9.5.1.1	Sign up of 3 cluster groups	30 September 2013	-	-	EA Technology	Complete
9.5.1.2	Sign up of 5 cluster groups	31 December 2013	-	-	EA Technology	Complete
9.5.1.3	Sign up of 100 customers in at least 7 cluster groups	31 March 2014	5 March 2014	v1.0	EA Technology	Complete
9.5.1.4	Sign up of 10 cluster groups	31 August 2014	5 March 2014	v1.0	EA Technology	Complete
9.5.2	Allocation of Cluster Funding	31 August 2014	-	-	EA Technology	Complete
9.5.3	Social Trials: Sign up minimum of 100 EV drivers	31 August 2014	-	-	EA Technology	Complete
9.6	9.6.1 Findings from socio-economic analysis on public reaction to the Esprit technology	30 October 2015	20 October 2015	Issue 2	De Montfort University	Complete
9.7	9.7.1 Technology Integration Assessment Report containing: a) Views of the OEM community on the impact of charge cycling on EVs b) Recommendations of suitable cycle times for EVs for demand-side response c) Evidence on whether the Esprit solution is feasible	30 June 2015	22 May 2015 (approval date)	Issue 1	EA Technology	Complete
9.8	9.8.1 Modelling to assess additional thermal and voltage headroom	30 November 2015	-	-	EA Technology / University of Manchester	In progress

SDRC	Document Title	Planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
9.8.2	Potential cost and carbon emission savings	30 November 2015	-	-	EA Technology / University of Manchester	In progress

Other internal project deliverables:

Deliverable Reference	Document Title	Original Planned Delivery Date	Re-planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
Task 1i ¹⁰	Assessment of the initial trial and recommendations on improvements to the design	12 March 2013	30 June 2014	28 June 2014	v01	University of Manchester	Complete
Task 1ii ¹¹	Technical literature survey of load shifting potential of EVs and heat pumps	30 May 2014	25 August 2014			University of Manchester	Completed
Task 1iii	Social-economic literature survey of customer behaviour with EVs and acceptance of direct control of appliances	28 June 2013	-	28 August 2013		De Montfort University	Completed ¹²
Task 3i	Report(s) confirming integration of the technology into charging points or other loads ¹³	30 June 2015	-			EA Technology	Completed ¹⁴

¹⁰ The Deliverable Task 1i has been supplied in UoM Deliverable 1.1 from their first Work Activity

¹¹ The Deliverable Task 1ii has been supplied in UoM's second deliverable report from their Work Activity 2

¹² EA Technology confirmed during the M30 Review Meeting that this internal project deliverable (Task 1iii – Social-economic literature review) has been delivered

¹³ This internal project deliverable may have been incorporated into SDRC 9.7.1

¹⁴ This internal project deliverable is included in SDRC 9.7.1

Deliverable Reference	Document Title	Original Planned Delivery Date	Re-planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
Task 4i ¹⁵	Report(s) confirming charging points, Esprit technology and monitoring installed	28 March 2014	3 October 2014			EA Technology	Completed
Task 4ii	Report documenting likely number and length of switch-offs under different scenarios, including impact of higher capacity charging	28 March 2014	31 October 2014	October 2014	v1.1	EA Technology	Completed
Task 5i ¹⁶	Data collection report 1	2 June 2014	-			EA Technology	Completed
	Data collection report 2	1 December 2014	-	16 December 2014	v1.0	EA Technology	
	Data collection report 3	1 June 2015	-			EA Technology	
	Data collection report 4	1 December 2015	-			EA Technology	
Task 6i	Report on results from pre-trial questionnaires (Technical and Social Trials)	28 March 2014	-	-	-	De Montfort University	No longer included in the project plan
	Report on results from questionnaires issued 6 weeks after receiving the electric vehicle (Technical and Social Trials)	30 May 2014	-	-	-	De Montfort University	No longer included in the project plan
	Report on results from questionnaires issued 3 months after receiving the electric vehicle (Technical and Social Trials)	25 July 2014	-	-	-	De Montfort University	No longer included in the project plan

¹⁵ A separate report for Internal Project Deliverable Task 4i has not been prepared. However, confirmation of installation of charging points, Esprit technology and monitoring equipment has been provided in the Monthly Project Assurance Reports and Meeting Minutes, and in the Six Monthly Progress Review Report (Task 11 documents)

¹⁶ The Data Collection Reports from Task 5 are now produced monthly, and are the outputs of ongoing data analysis

Deliverable Reference	Document Title	Original Planned Delivery Date	Re-planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
	Report on results from questionnaires issued 10 months after receiving the electric vehicle (Technical and Social Trials)	19 December 2014	-	-	-	De Montfort University	No longer included in the project plan
	Final Report on results from customer interviews and social economic analysis	29 May 2015	First draft – 24 August 2015 ¹⁷ ; Issue SDRC 16 October 2015			De Montfort University	Incorporated into SDRC 9.6
Task 7 D1.1, 1.2 & 1.3	Combined Report <ul style="list-style-type: none"> Creation of computer-based models to mimic the trial, i.e., corresponding behaviour of (dummy) loads and the technology Report for WP 1 on findings from the initial trial data and the potential improvements of the logic and design of the technology Data requirements for LV network monitoring and agreed approach for data transfer to Manchester University 	30 June 2014	30 June 2014	28 June 2014		UoM	Complete

¹⁷ EA Technology confirmed that the delivery of the draft report for Task 6i has been postponed to 24 August 2015 at the request for De Montfort University

Deliverable Reference	Document Title	Original Planned Delivery Date	Re-planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
Task 7 D2.1, 2.2 & 2.3	Combined Report <ul style="list-style-type: none"> • Translation of network data from SEPD and potentially other DNOs into OpenDSS • Creation of non-validated computer-based models of monitored LV networks ready to be used for planning studies • Review of available data and techniques to model EV loads including an initial assessment for load shifting 	25 August 2014	25 August 2014	25 August 2015		UoM	Complete
Task 7 D3.1, 3.2, 3.3. & 3.4	Combined Report <ul style="list-style-type: none"> • Translation of data/reports from monitoring devices into OpenDSS • Production of validated LV networks • Creation of aggregated profiles with and without EVs based on monitored data • Representative LV networks 	19 December 2014	19 December 2014	15 December 2014		UoM	Complete
Task 7 D4.1	Combined Report <ul style="list-style-type: none"> • Scenario-based deterministic impact studies on validated and representative LV networks considering BAU integration • Report on findings from the monitoring data and the potential technical and economic challenges that future EV/EHP penetrations will pose to the management of LV networks 	25 May 2015	25 May 2015			UoM	Complete

Deliverable Reference	Document Title	Original Planned Delivery Date	Re-planned Delivery Date	Actual Delivery Date	Current Version	Author Organisation	Status
Task 7 D5.1	Combined Report <ul style="list-style-type: none"> Scenario-based deterministic impact studies on validated and representative LV networks considering the technology Report on the economic and environmental benefits from adopting the technology 	31 August 2015	31 August 2015	30 September 2015	v4	UoM	Completed
Task 10i	Dissemination plan	30 April 2013	-	January 2013	0.4	EA Technology & Automotive Comms	Reviewed

Note:

- Little information has been received regarding progress or deliverables from Task 1
- Data collection reports from Task 5 have been produced monthly, at the request of SSEPD.
- The "for information" pack from Task 6 included communication regarding the revising the timeline for the questionnaires, focus groups and interviews. This is in reaction to the various issues associated with the Esprit technology, which have affected De Montfort University's delivery timetable. The exact delivery timetable is still under discussion since it is dependent on the results of the latest software upgrade for the Monitor Controllers.
- In the M18 Review, deliverables for Task 7 were added to this table to align with the Schedule of Deliverables for Task 7.

APPENDIX 3 EXPLANATION OF RAG INDICATORS FOR EACH REVIEW QUESTION

Question	RAG Indicators		
What is the reviewers' overall assessment of the project so far?	Excellent / Good	Adequate	Poor
Have the objectives for the period been achieved?	Yes	Partially	No
Has the project made satisfactory progress towards meeting the overall project objectives?	Yes	Partially	No
Has each Task made satisfactory progress against the Project Plan of Works?	Yes	Partially	No
Has the project implemented the recommendations from the previous Independent Review?	Yes	Partially	No
Have planned SRDCs been achieved for this reporting period?	Yes	Partially	No
Have planned milestones been achieved for this reporting period?	Yes	Partially	No
What is the reviewers' opinion of the delivered SDRCs?	Excellent / Good	Adequate	Poor
Has the project management been performed as required?	Yes	Partially	No
Has the collaboration between project partners and sub-contractors been effective	Yes	Partially	No
Is there evidence of underperforming project partners or sub-contracts, lack of commitment or change in interest?	No	A little	Yes
Have the project partners adequately publicised the project to raise awareness of the project with the general public?	Yes	Partially	No
Have the project partners adequately disseminated results and learning from the project?	Yes	Partially	No

APPENDIX 4 MY ELECTRIC AVENUE DATA COLLECTION TOOLS

The purpose of Appendix 4 is to provide Ricardo staff with a high-level explanation of the various data collection tools and services that are being used by the My Electric Avenue project. Hard data is recorded and collected from the Monitor Controllers (MCs), Intelligent Control Boxes (ICBs) and electric vehicles. Soft data is collected directly from the Technical and Social Trial participants.

The Monitor Controllers and ICBs are components of the Esprit technology. For each Technical Trial cluster, the Monitor Controller is located in the substations for the Low Voltage feeder. The ICBs are connected to the recharging units for participants in the Technical Trial. The My Electric Avenue project is using **Nortech's iHost Platform**¹⁸ for remote monitoring and data collection from the Monitor Controllers and Intelligent Control Boxes (ICBs).

Nortech supply specialist monitoring technology products and services to energy utilities, generator suppliers and system integrators. They use wireless communication technology, such as GPRS, to provide real-time data displays. Email and SMS text messaging can be used to alert the project team if a data alarm is triggered. The iHost Platform provides a secure, reliable, central host platform for receiving and storing data from a number of remote sites using various communication channels and protocols.

The Monitor Controller includes an Envoy unit, which is a Nortech component for sending the data to the iHost central server. The MC receives data from the ICBs on the low voltage network, and forwards this data to iHost. The data string includes:

- MC or ICB serial number
- Date and time stamp, to nearest second
- Voltage for each phase
- Current for each phase

The Nissan CARWINGS service is a vehicle telematics service available for the Nissan LEAF. A CARWINGS app¹⁹ is available that allows Nissan LEAF drivers to control some vehicle functionality from their smart phone, such as checking the current charge level, start charging, check when charging should be complete, turning on or off climate control, scheduling when to turn on climate control, and checking the estimated driving range. The MEA project are using the CARWINGS service to collect vehicle data from the Technical and Social Trial vehicles. EA Technology are working with Nissan to clarify which data fields can be made available to the project team. Data from the CARWINGS service includes:

- Vehicle Identification Number (VIN)
- Trip start time and finish time, to nearest second²⁰
- Trip distance

¹⁸ Further information on the Nortech iHost Platform is available on their website:
<http://nortechonline.co.uk/products/ihost-platform/> [Last Accessed: 1 July 2014]

¹⁹ http://www.nissan.co.uk/GB/en/YouPlus/welcome_pack_leaf/how_does_it_work.html [Last Accessed: 1 July 2014]

²⁰ Nissan CARWINGS defines the trip as the period between vehicle key on and key off. It is possible that a trial participant's journey consists of more than one trip, if they stop the vehicle at points during the journey, such as stopping at a service station

- Battery state-of-charge at the beginning of the trip, provided as number of segments²¹
- Battery state-of-charge at the end of the trip, provided as number of segments

EA Technology have requested GPS coordinates to be included in their data set so they can identify where the car was recharged. However, this data is not recorded by the Nissan CARWINGS system.

The Nissan LEAF sends data to the CARWINGS service after 10 trips. Therefore the frequency of data updates is dependent of how much the participant is using the vehicle.

De Montfort University are responsible for collecting soft data from the Technical and Social Trial participants, via questionnaires and face-to-face interviews, which are activities within Task 6.

²¹ The Nissan LEAF displays battery charge using 12 segments

APPENDIX 5 RICARDO COMMENTS ON DOCUMENTS PROVIDED FOR REVIEW & INFORMATION

Appendix 5 contains commentary on the documents submitted for review and for information. Suggestions for improvement are emphasised in **bold blue**. Open questions or issues are emphasised in **bold orange**.

MEMO – Summary of project outputs for the Month 36 Independent Review

Filename: *MEA 36 Month Independent Review Memo.docx*

Document Number: **#1 – For Review**

A really useful and valuable guide to the documentation submitted for the M36 Independent Review.

Appendix 5A SDRC 9.2 & 9.3 Report

An assessment of third part delivery of a low carbon innovation project

Filename: *86003_R_SDRG_9_2_9_3 Issue v2 3 EATL Final.pdf*

Document Number: **#2 – For Review**

A high quality, professional document capturing the learning from the novel commercial arrangement. This will be a useful, insightful and valuable document for Ofgem, DNOs and potential 3rd Party Lead Suppliers.

The report has an excellent Executive Summary, which captures the key messages and learning points from the novel commercial arrangement used in this project.

The report contains several useful diagrams for providing overviews and explaining processes. However, the font size is small, making them difficult to read (see Figures 1-3).

The recommendations for improving the Change Request process are good, and should be noted by Ofgem (Section 4.2.8, pp 27-28).

Changes made by Ofgem in the Project Direction had significant consequences for the MEA project team, as discussed in Section 7. It is good that the EA Technology and SSEPD have raised the resulting issues in this report. Another unintended consequence of Ofgem's funding restrictions, which is not discussed in this report, was the additional technical risk. Various issues with the Esprit technology installation and use could have been corrected earlier, at less cost, if the MEA team had been allowed to phase the setup of the Technical Trial clusters, as originally proposed.

In Section 7.4.3 on LCN Fund reporting, the MEA team recommend a 2-month period for compiling, reviewing and issuing the six-monthly progress reports. It is the opinion of the Independent Reviewers that a 2-month period is too long (equivalent to one third of the reporting period). That a 2-month period would be required implies that the process for periodic reporting is cumbersome.

The six-monthly progress reports should have been key documents for the six-monthly Independent Review. However, due to the reporting and approval processes, these reports were often not available at the time of the Independent Reviews.

The Reviewers recommend a more thorough review of the six-month report processes, which should include discussions with Ofgem. The objective should be to minimise the steps so that the six-monthly progress reporting can be achieved within 2-3 weeks, following the end of the reporting period.

In Section 7.4.4 the MEA project team recommend that Ofgem take a holistic view of the effective project management of an innovative R&D project, rather than expenditure as "isolated silos" for cost saving. The Independent Reviewers thoroughly agree with this recommendation.

The report contains a several incorrect cross references, which probably result from the merger of several documents into one report. The following incorrect references were identified by the Reviewers:

- p33 – Reference to Table 1 in Appendix A. However, there isn't an Appendix A or a Table 1 in the document
- p33 – Incorrect reference to Table 2. The reference should be for Table 3
- p34 – Reference to Figure 1, which should be a reference to Figure 6
- p34 – Reference to Section 5, which should be a reference to Section 6.5
- p39 – Reference to Table 3 in Appendix B, but the document does not have an Appendix B
- p42 – The structure of Section 7 outlined in the introduction does not align with the actual structure, and section numbers, of Section 7
- p44 – Reference to Appendix A in footnote, which does not exist in this document

Principal Contract Template (Revised)

Filename: *86003_R_SDRG 9.2.3 - Principal Contract Template - Issue 2.1.pdf*

Document Number: **#3 – For Review**

This document was previously reviewed in the Month 6 Independent Review (RD.13/280901.2). In addition to the usual Independent Review team, Issue 2.1 has also been reviewed by Michael Stocker from Ricardo's Legal Team. The feedback below is designed to provide general ideas and tips on how to improve the document. It does not constitute legal advice.

It is good that a template for the Principal Contract has been provided as a project deliverable. This will be a useful starting point for future LNC Fund projects seeking to have a 3rd Party Lead Supplier. However, **another round of editing would help to improve the document consistency and make it more user friendly.** This would make it easier to adapt for a new project. Suggestions for improving the template are provided below:

- **Defined terms should be reviewed and consolidated to shorten the document and avoid inconsistencies.** For example:
 - Confidential Information is defined twice, first in Clause 1.1 (p1) and again in Clause 16 (p10).
 - The terms Deliverables, Documentation, and Goods, defined in Clause 1.1 (p2) are not used in the agreement.
 - Terms defined in the body of the document should be in bold or referenced in the Definitions section.

- On page 3, the definition of “Term” refers to 31 December 2015. This should be replaced with [END OF TERM DATE].
- “System” is referred to in the definition of “Customer” (p2), but is not defined.
- Consider adding “Management & Delivery Document” as a separate defined term.
- **Clause numbering and cross references should be automated to support future edits.**
- **The drafting should be reviewed throughout for clarity and readability, focusing on removing unnecessary text and adopting plain English wherever possible.** For example:
 - “Including but not limited to” can be changed to “including” if supported by a general interpretation rule similar to those in Clause 24.2.
 - The Supplier and Customer Obligations sections (p4-6) are lengthy and complicated.
 - On page 16, a payment related clause is separated from the other payment clauses.
 - Appendix D and Appendix I are not referenced within the agreement.
- **Consider making obligations mutual where possible to minimise the scope for negotiation and encourage fairness and cooperation.** For example, on page 10, obligations concerning confidential information only apply to the Supplier in some cases. On page 14, the prohibition on publication only applies to the Supplier.

Disclaimer: While care has been taken in the preparation of these comments, such comments are supplied for the assistance of the relevant client and are not to be considered as legal advice or relied on as authoritative or as in substitution for the exercise of judgement by that client or any other reader.

Appendix 5B SDRC 9.6 Report

SDRC 9.6: An assessment of the public acceptance of Demand Side Response of EV charging using Esprit

Filename: *My Electric Avenue (I2EV) SDRC 9.6 Issue 2 2.pdf*

Document Number: **#4 – For Review**

Since the Independent Reviewers are engineers and not social scientists, we are unable to comment on how this report compares with other social science reports. However, the document appears to be well written, conforming to the expected style and content of a scientific report. The “Summary of Findings” boxes are usefully for quickly understanding the key results from the questionnaires and interviews.

Analysis of the data from the domestic Technical Trial participants was split into those who had noticed charging curtailment (Domestic Curtailed) and those who had not noticed charging curtailment (Domestic Non-curtailed). Information on how many Technical Trial participants had their EV charging curtailed is provided in SDRC 9.8. SDRC 9.8 also reports the number of ICBs that never received a “curtail charging” signal from the MC, and the number of ICBs that did receive the signal but never had an EV connected at the time.

Given the resources and effort required to establish the Technical Trial, it is disappointing that the Domestic Curtailed group is less than 25 participants. It is good that the report authors comment on this in the Conclusion.

During the M36 Review Meeting, EA Technology confirmed that some Technical Trial did not experience EV charging curtailment because of when they chose to plug-in the EV. From the data collected, it appears that several participants regularly plugged their EV in to charge around 23:30. Since this was outside the peak demand time, they never experienced charging curtailment via Esprit. It is not clear if their behaviour was influenced by awareness of LV network issues due to the trial.

EA Technology also confirmed that a small number of participants regularly plugged their EV into charge when they came home from work. Since this coincided with peak demand, they frequently experienced EV charging curtailment during the Technical Trial. Given this insight, it is unlikely that small size of the Domestic Curtailed sample is purely a consequence of the shortened Technical Trial period resulting from the Esprit technical issues. This insight is also extremely valuable learning for the future development and implementation of demand side response systems such as Esprit.

The authors of SDRC 9.6 comment that the MEA participants were not representative of the UK population as a whole. However, little information has been provided as an explanation (one paragraph in Section 3.1).

- **How great is the variation between the MEA participant sample and the UK population?**
- **How representative is the MEA participant sample of likely future EV users?**

Section 3.4 on EV Charging discusses the results on ease of charging away from home and of using public charging points. Discussions with EA Technology during the M36 Review Meeting confirmed that feedback from participants suggested that it was more difficult to use public charging points due to availability. As the number of plug-in vehicles increases, the public charging points are more frequently in-use.

Section 3.6 is about Comfort with Esprit. The results presented are confusing. Further explanation would add clarity.

- **In Figure 3-30 and Figure 3-31, is the maximum number of charging curtailments the total by participant, or by cluster, or total across all clusters?**
- **Please add an x-axis label to Figure 3-30 and Figure 3-31**

Comments from the questionnaires and focus groups are valuable for setting the requirements for the next Esprit design (Section 3.6.1).

Feedback from participants regarding the MEA trial and project team is very good, and encouraging for future technology trials. It confirms the good work done by the MEA team during participant recruitment and during the trial.

Appendix I is supposed to list the questionnaire questions. However the questions are missing.

- **Why have the questionnaire questions not included in this report?**

EA Technology will arrange for the questionnaire questions to be made available on the MEA project website, alongside the SDRC 9.6 report.

The MEA webinar from July 2015 included initial statistics from the Technical and Social Trial, such as state of charge when first plugged in. It is implied that the interim results will be discussed further in DMU's report. Unfortunately, not all of these behaviour aspects have been

discussed in SDRC 9.6. This is because this initial analysis was conducted by Becky Lees, who has since left EA Technology.

What results will be included in the remaining MEA reports?

Appendix 5C SDRC 9.8 Report and Input Documents

An assessment of how much headroom an Esprit type solution would yield

Filename: 86002_7_R_SDRG 9_8 Draft 1.0.pdf

Document Number: #5 – For Review

This has the potential to be a very good report, capturing key learning about the Esprit technology and future benefits.

The Introduction section is very good, providing relevant background information to help the reader understand the context of the report.

Chapter 2 provides a short, but relevant, discussion on the uptake of EVs and other technologies that could disrupt "business as usual" for UK electricity networks.

Chapter 3 provides a concise introduction to the My Electric Avenue project and Esprit technology. **It would be useful to include references to the MEA reports that discuss the learning from the Novel Commercial Arrangement (i.e. SDRC 9.2 & 9.3).** During the M36 Independent Review Meeting, EA Technology confirmed that the next version of this report contains the MEA document map.

Should Slough BC be included in Table 1? The report refers to 10 clusters in the Technical Trial, not 11. During the M36 Review Meeting, EA Technology confirmed that a footnote has been added to explain why this group was removed from the Technical Trial and placed in the Social Trial instead.

In Chapter 4, Figures 5-8 have the same figure label, which could confuse readers. During the M36 Review Meeting, EA Technology confirmed that the lay-out of these figures have been changed, following feedback from SSEPD. Also, the "Number of Connections" is number of EV charging connections per day.

Chapter 5 effectively communicates what has been learnt about the operation of Esprit, including aspects of the Esprit design that will require redevelopment for the next generation prototype.

The third paragraph in Section 6.3.1 (p58) does not make sense. If the lead time for Esprit is 12 weeks, then it needs to be ordered more than 12 weeks before it is required. Therefore, the sentence "... an ideal scenario would be to install Esprit 12 weeks prior to the date of the first exceedance ..." does not make sense in the context of this paragraph.

Section 6.5.2.1 discusses the number of "threshold exceedances" recorded in the Technical Trial data by cluster and phase. **It would be helpful to include information about the duration of the Esprit trial in each cluster**, since this varied widely. However, it should be noted, that in the text accompanying the table it clearly states that the "threshold exceedances" are provided for the same 12 month period.

The number of the participants in the Technical Trial changes throughout the report. For example, Table 1 (p17) states there were 96 Technical Trial participants in April 2015. Section 4.1.1 refers to 99 Technical Trial participants. However, Section 6.5.2.2 (p69-71) refers to 93

Technical Trial participants. The number of Social Trial participants also changes. This is likely to confuse readers who are not familiar with the project. **It would be helpful to include an explanation as to why the number to Technical Trial and Social Trial participants changed over the duration of the project.**

It is good to know that only 9 Technical Trial participants never experienced a switch event (Figure 39, p70). However, it is disappointing that another 16 Technical Trial participants never experienced a switch event while their EV was charging (Figure 40, p70).

A small number of Technical Trial participants experienced over 80 charging curtailment events during the Technical Trial (Figure 41, p71). **Is it understood why these participants experienced a higher level of charging curtailment than other participants? Does this relate to the Esprit control logic, or other factors? Could this knowledge be used to improve the Esprit design?**

In the draft version of SDRC 9.8 provided for this review, several errors were discovered in the analysis of carbon savings presented in Chapter 8. The diesel vehicle emission factor quoted, 0.12 kgCO₂e/km, appears to have been adapted from the average new car CO₂ emissions for UK in 2014, which was 124.6 gCO₂/km. This fleet average has considered all new gasoline and diesel passenger cars registered in the UK in 2014. It is not necessarily representative of vehicles equivalent to the Nissan LEAF. **It would be better to compare the Nissan LEAF performance with similar size vehicles, such as the new Nissan Pulsar.**

The source used for Well-to-Tank data for diesel is old (last updated in 2012). It also appears to be closer to a Well-to-Wheels factor than a Well-to-Tank factor. **More recent results of Well-to-Wheels analysis for different types of fuels is available from the JCR CONCAWE EUCAR consortium** (Available at: <http://iet.jrc.ec.europa.eu/about-jec/downloads>, accessed 17 November 2015).

The Well-to-Wheel Carbon Savings analysis was discussed with James Cross via email and telephone on Wednesday 18 November 2015. At the M36 Review meeting and during subsequent conversations, EA Technology confirmed that the carbon analysis presented in Chapter 8 has been updated in the next version of the SDRC 9.8 report.

Work Activity 1 "Evaluation of the initial trial" – Report for Deliverables 1.1, 1.2, and 1.3

Filename: *UoM-EA-Technology_MEA_Deliverable1.1-1.3v01.pdf*

Document Number: **#6 – For Information**

Work Activity 2 "Low Voltage Networks" – Report for Deliverables 2.1, 2.2, and 2.3

Filename: *UoM-EA-Technology_MEA_Deliverable2.1-2.3v03.pdf*

Document Number: **#7 – For Information**

Work Activity 3 "Model Validation and Data Analysis" – Report for Deliverables 3.1, 3.2, 3.3 and 3.4

Filename: *UoM-EA-Technology_MEA_Deliverable3.1-3.4v05.pdf*

Document Number: **#8 – For Information**

Work Activity 4 "Business as Usual Deterministic Impact Studies" – Report for Deliverables 4.1 and 4.2

Filename: *UoM-EA-Technology_MEA_Deliverable4.1-4.2v03.pdf*

Document Number: **#9 – For Information**

These four reports have been reviewed in previous Independent Reviews.

Work Activity 5 "ESPRIT-Enabled Deterministic Impact Studies" – Report for Deliverables 5.1 and 5.2

Filename: *UoM-EA-Technology_MEA_Deliverable5.1-5.2v04.pdf*

Document Number: **#10 – For Information**

Another high quality, professional report from the University of Manchester. This document completes the internal project deliverables from Task 7.

How sensitive are the impact studies to the EV charger rating? How different would the results be if the EV owners had 7 kW chargers instead of 3.6 kW? These questions were discussed during the M36 Review Meeting. **One option for future analysis is to re-run the models assuming 7 kW chargers instead of 3.6 kW.**

How has the Operational Expenditure (OPEX) for Esprit been calculated? (p21-23) It was assumed that the Esprit system would require maintenance every 5 years (see the Transform model template).

How sensitive is the economic analysis to the assumed length of reinforced LV cable? (p21-23) The University of Manchester assumed that the reinforced LV cable would be at least 100 m.

How have the CO₂e emissions from operation of Esprit been calculated? How have the CO₂e emissions from operation been calculated for the reinforced LV network option? (p24-25) This relates to the energy losses. The impedance of the cable depends on its diameter. Therefore, since the reinforced LV cables will have a larger diameter, their impedance will be lower, leading to less energy losses. The Esprit system will also have less energy losses than the conventional LV cable without Esprit because Esprit will curtail EV charging if thresholds are breached. However, these energy loss savings are less than reinforcing the LV cable. The University of Manchester used these differences in energy losses to estimate the CO₂ impact. **This methodology is not obvious to the novice reader, so further explanation in the report may be required.**

Given that this report concludes that the incumbent solution (reinforced LV network) requires less investment and has a better carbon footprint, what is the business case for continuing to develop Esprit? Further discussion of the business case for Esprit is provided in SDRC 9.8. The technology needs to be considered in a wider systems context, due to the range of benefits it offers. For SDRC 9.8, EA Technology entered Esprit into their Transform macro-scale model, in order to conduct the next level of economic analysis.

Following the My Electric Avenue project it would be wise for EA Technology, the technology developer, to re-evaluate the business case for Esprit, prior to committing to further R&D investment.

Has any analysis been done on how many ICBs could be controlled by one Monitoring Controller? Feedback from EA Technology indicated that in theory, hundreds of ICBs could be controlled from one monitoring controller. Increasing the number of ICBs will also aid PLC communications with the MC. However, it also depends on the frequency of control required and to what extent. There is an upper limit whilst using PLC due to the 'flooding' of the network with PLC signals. This was one of the issues experienced with Esprit earlier in the MEA project.

Smart Variant

Filename: *EspritSolutionTemplate.pdf*

Document Number: **#11 – For Information**

The Excel file has been prepared by EA Technology to update their Transform® model for forecasting expenditure on networks in the future. Updating the Transform® model is discussed in SDRC 9.8.

Evaluation of Power Line Carrier communication for direct control of electric vehicle charging

Filename: *PLC Communication Reliability Report.pdf*

Document Number: **#12 – For Information**

Another high quality report from the My Electric Avenue. Communications issues with the PLC were raised in previous Reviews. It is good that the project team decided write this report to document their learning about PLC reliability. Their recommendations should be noted by future innovation projects intending to use PLC for data transfer.

Chapter 1 provides useful background information about the My Electric Avenue project and Esprit technology. Chapter 2 provides useful background information about PLC.

- In Figure 4 (p12), there is an error in the y-axis label – this has be fixed in the next version of the report
- In Section 4.3, there is a missing cross reference in the third paragraph (p13) – this has be fixed in the next version of the report
- **In Figure 6 (p14), would the correlation improve is the >250m ICB was treated as an outlier?**
- What would the PLC communication reliability analysis look like if all ICBs were considered? For ICBs on a multiple ICB signal path, the distance could be taken and distance between ICBs. During the M36 Review Meeting, EA Technology confirmed they had investigated this, but were unable to identify any clear trends.

Successful Delivery Reward Criteria 9.7.1 – An Assessment of ‘Esprit’ Integration

Filename: *86002_8_R_SDRC 9.7 Issue 2.pdf*

Document Number: **#13 – For Information**

SDRC 9.7.1: Impact of Esprit on Cable Thermal Ratings

Filename: *86002_8_R_Cable Thermal Rating SDRC 9.7 Issue 4.pdf*

Document Number: **#14– For Information**

SDRC 9.7.1 Voltage Variance: the Impact of Electric Vehicles

Filename: *86002_8_R_Flicker Analysis SDRC 9.7 Issue 4.pdf*

Document Number: **#15 – For Information**

SDRC 9.7.1 Impact of Esprit on Heat Pumps – Supporting Documentation

Filename: *86002_8_R_HeatPumpImpactEsprit_Issue 2 CONFIDENTIAL.pdf*

Document Number: **#16 – For Information**

These documents were reviewed in the previous M30 Independent Review.

Appendix 5D Evidence of Successful Decommissioning

Decommissioning Schedule

Filename: *Decommissioning Schedule 4-Nov-2015.xlsx*

Document Number: **#17 – For Review**

This document records that as of 4 November 2015 most of the ICBs had been decommissioned and removed from the trial participant properties.

It is assumed that the dates in Columns C, D and E related to the installation of the charging points and ICBs.

During the M36 Review Meeting, EA Technology confirmed that all ICBs had been removed and most of the paperwork and photographs had been received.

Note – Column A in the spreadsheet is hidden to protect the names of Technical Trial participants. However, the print area was not updated. As a consequence, the first print of this spreadsheet included participant names. This was noticed by the Independent Reviewer, who changed the print area and reprinted the document to remove the participant names. The printouts containing the participant names have been shredded.

Decommissioning Information Sheet

Filename: *86002_4_ICB Decommissioning Audit Sheet_Main_v2.xlsx*

Document Number: **#18 – For Review**

This spreadsheet contains information regarding the ICB identification numbers, location prior to decommissioning, a link to the photographs received, (current?) status, decommissioning sheet received and deed document received.

The "deed document" relates to participants taking ownership of the EV charger, if they have requested to keep the EV charger.

The Decommissioning Schedule was used by Lois Warne at ZCF to manage the various stakeholders involved in the decommissioning process, such as the contractors. The Decommissions Information Sheet has been used by EA Technology as an audit sheet, to verify that the decommissioning has occurred.

Picture – 14631 Audit at EATL

Filename: *14631 Audit at EATL.jpg*

Document Number: **#19 – For Review**

Picture – ICB Removed

Filename: *ICB Removed.jpg*

Document Number: **#20 – For Review**

Picture – MC Removed

Filename: *MC Removed.jpg*

Document Number: **#21 – For Review**

It is good to know that numerous photographs have been taken during the decommissioning to record decommissioning activities. However, the pictures submitted for review are fairly meaningless unless the pre-decommissioning photographs are also included.

Appendix 5E Learning Log

My Electric Avenue (I²EV) Learning Log

Filename: *I2EV MEA Combined Learning Log 2015 v 0_7.xlsx*

Document Number: **#22 – For Review**

A good historical record of the learning captured during the My Electric Avenue project.

Many of the points raised regarding the commercial arrangement and novel contract have been discussed further in the SDRC 9.2 & 9.3 report.

Learning about network challenges has been disseminated using a range of methods (see the dissemination activities listed in Chapter 9). For example, the MEA team organised a briefing session for the NPG LV design team.

The plugged-in party, scheduled for September 2015, was cancelled due to lack of interest from participants.

Few complaints regarding EV charging curtailment were received from domestic Technical Trial participants. However, **given the limited number of Technical Trial participants that actually experienced EV charging curtailment during the Technical Trial, was the sample size large enough to conclude this wouldn't be an issue in the future?**

The Independent Reviewers expected to see more learning from the Esprit technology, data handling and data analysis. EA Technology confirmed this has been captured as "Internal" learning points.

Appendix 5F Approved Change Request to the Project Direction

Change Request to Project Direction v1.10

Filename: *My Electric Avenue (I2EV) Project Direction Change Request Issue 4.3.pdf*

Document Number: **#23 – For Information**

LETTER – Low Carbon Networks (LCN) Fund – approval of requested amendments ...

Filename: *I2EV Change request decision letter_July2015.pdf*

Document Number: **#24 – For Information**

It is very good that Ofgem have approved the Change Request to Project Direction.

However, the Independent Reviewers were puzzled by Ofgem's comment on page 4

"Given the early awareness which you had of these issues, it may have been possible to provide a comprehensive and coherent explanation with supporting evidence earlier in the Project."

The Change Request to Project Direction was first reviewed during the Month 12 Review. Issue 1.0 was dated 27 August 2013, approximately 9 months after Ofgem issued the Project Direction to SEPD. However, the first attempt to get a Change Request was abandoned after one year, and a revised Change Request was submitted. It appears that Ofgem has not kept sufficient records to register this first Change Request, or that the Change Request had to be re-submitted due to project progress.

It would be wise for Ofgem to review their Change Request process for LCN Fund projects. A protracted process increases the financial, commercial and technology risks for the project stakeholders.

Appendix 5G Project Deliverable Map

MEA - Deliverable Map

Filename: *MEA - Deliverable Map 27_10_15 - A3.pub*

Document Number: **#25 – For Information**

A useful overview of the documents generated by the My Electric Avenue project. **It would be helpful if the document included a legend to explain the use of colours.** Also, **the formatting could be improved to make it easier to read** (font sizes very small). It may be beneficial to **include the SDRC references so show how these documents related to the official project deliverables.**

The version of this living document submitted for review was dated 27 October 2015. With only two months remaining, it is good to see that most documents have already been completed. The documents marked "yellow" (work in progress) relate to SDRC 9.8, which is due for completion during November 2015. The documents marked "red" relate to the M36 Independent Review and subsequent assessment report. Activities to complete these documents have now begun.

APPENDIX 6 RICARDO COMMENTS ON OTHER DOCUMENTS CONSIDERED DURING THIS REVIEW

Appendix 6 contains commentary on the documents submitted for review and for information. Suggestions for improvement are emphasised in **bold blue**. Open questions or issues are emphasised in **bold orange**.

Month 30 Independent Review Response

Filename: *My Electric Avenue - M36 Review Report.docx*

Document Number: **#26 – For Information**

EA Technology's response to the M30 Independent Review highlighted three of the recommendations for the remaining three months:

- Ensure appropriate peer review processes
- Prepare a contingency plan for the decommissioning process
- Ofgem decision regarding Change Request

Ofgem's decision regarding the Change Request was received in early July (see document #24). Therefore this action is closed

Peer review processes and contingency plans for decommissioning are topics included within this review.

Note: The date on the front cover does not match the document history on page 2

Top 10 tips for managing electric vehicle uptake

Document Number: **#27 – For Information**

The next instalment in the My Electric Avenue "Top 10 Tips" series. This one draws on learning reported in SDRC 9.7 and SDRC 9.8.

- **When results from MEA are quoted, it would be good practice to include a reference to the relevant MEA report.**
- Regarding uptake of EVs, we expect there will be a bigger uptake of plug-in hybrids rather than pure electric (only) vehicles. Plug-in hybrids will have smaller batteries than EVs, but are more likely to be charged daily. This could have implications for the roll-out of Esprit type systems designed to protect the low voltage network.
- What are the "proven solutions"? James Cross was thinking of the incumbent solutions, such as reinforcing the LV cable.