

My Electric Avenue (I²EV)

SDRC 9.4.1

24 Month Independent Review

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The 'My Electric Avenue' project is the public identity for the Low Carbon Networks Fund Tier 2 project "I²EV." The formal title "I²EV" is used for contractual and Ofgem reporting purposes.

Project leads



Project partners



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

Version Tracking

Date	Version	Author/s	Notes	Reference documents
22/01/2015	0.1	TB		Schedule to Project Direction v1.10 24-month Independent Review
23/01/2015	0.2	BL		
27/01/2015	0.3	RH	Update from SSEPD	
30/01/2015	0.4	DAR	Final comments.	

Final Approval

Date	Version	EA Technology authorisation by	SEPD authorisation by
27/01/2015	0.2	Daniel Hollingworth	
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1 Introduction

1.1 Purpose

The purpose of this document is to provide a response to the fourth six month review of the I2EV (My Electric Avenue) project that has been completed by the independent consulting company appointed for this task, Ricardo UK Ltd, hereafter referred to as Ricardo.

1.2 Background

Ricardo is responsible for completing regular independent reviews of the I2EV (My Electric Avenue) project. As stated in the Project Direction¹ the Successful Delivery Reward Criterion (SDRC) for the independent review process are as follows:

Table 1-1: SDRC for the Independent Review Process

Successful Delivery Reward Criterion	Evidence
<p>9.4 An assessment of how the DNO and other interested parties can ensure independent validation of a third party's Solution throughout a project, and upon completion.</p> <p>Related learning: Learning outcome C1.3.2 - how are the project and results validated?</p> <p>Related Task: 9 - Project recommendations and implementation</p> <p>Related commercial aims: Under 2.2 the commercial aims are to: - Demonstrate delivery of a low carbon network project by a non-DNO on behalf of a DNO.</p>	<p>9.4.1 The provision of 6 monthly independent reviews of the project and technology with specific inclusion of improvements and adaptations to working practices incorporated by the project team following the previous independent review.</p> <p>(a) Produce a 6 monthly report (highlighting strengths and improvement areas) to be tabled at steering group meetings. (b) Produce response to 6 monthly report, detailing improvements planned by Project Steering Group, as a result of the review.</p> <p>Achieved by months 7, 13, 19, 25, 31, and 36. (July 2013, January & July 2014, January, July & December 2015.)</p>

The month 24 independent review report completed by Ricardo meets the SDRC evidence requirement 9.4.1 (a). This report meets the SDRC evidence requirement 9.4.1 (b) as outlined in Table 1-1 above.

¹ I2EV Schedule to Project Direction ver 1.10

2 Independent Review: Executive Summary

The My Electric Avenue project is trialling a new technology for managing the supply of electricity to electric vehicles connected to a local distribution network. This project was submitted to Ofgem's Tier 2 Low Carbon Network (LCN) Fund as 'I2EV' but was rebranded as 'My Electric Avenue' in early 2013 to improve public acceptance. The project is led by EA Technology (Third Party Lead Supplier), with project partners Scottish and Southern Energy Power Distribution Limited (SSEPD) (the host Distribution Network Operator), Northern Powergrid, Nissan, Fleetdrive Electric and Zero Carbon Futures. Further support is provided via subcontractors, which include the University of Manchester, De Montfort University, Ricardo UK Ltd, Automotive Comms, and Creative Concern.

This report is the fourth of the periodic 6-monthly Independent Reviews. It covers the Reviewers' overall assessment of the project so far, and provides recommendations on specific improvements and adaptations to working practices to be incorporated by the project team.

The reporting period is 1 July 2014 to 31 December 2014, principally involving:

- **Technical Trial** – Completion of customer recruitment for the Technical Trials, as per SDRC milestones; re-installation of the redesigned Intelligent Control Boxes (ICBs) for the Esprit system; data collection, analysis and visualisation; resolving various issues with the Esprit system functionality
- **Social Trial** – Completion of customer recruitment for the Social Trial; issuing and collecting pre-trial questionnaires; delivery of remaining Nissan LEAF EVs to some Social Trial participants
- **Project Management** – Ongoing effective project management and coordination of project partner activities; submitting revised Change Request to Ofgem and responding to more requests for further information

The 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 with EA Technology.

Overall assessment of project so far

What is the Reviewers' overall assessment of the project so far?	Adequate
Have the key objectives for the period been achieved?	Partially
Has the project made satisfactory progress towards meeting the overall project objectives?	Partially
Has each Task made satisfactory progress against the Plan of Works?	Mostly
Has the project management been performed as required?	Yes
Has the collaboration between project partners and sub-contractors been effective?	Yes
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 successfully recruited over 100 people in 10 clusters to take part in the Technical Trial of the Esprit system for managing the charging of electric vehicles connected to

a local distribution network. MEA has also successfully recruited over 100 participants for the Social Trial. Nearly all participants have received their Nissan LEAF EV, with the remaining vehicles expected to be delivered in early 2015. The Esprit installation is completed, with the exception of one Monitoring Controller (MC) that is to be installed on the pole-mounted transformer in the Lyndhurst cluster.

Following the re-installation and commissioning of the Mark 2 design ICBs, charging curtailment events were observed in some clusters with a few ICBs. However, communication between the MCs and ICBs deteriorated with time in most clusters. This prevented the Esprit system from being fully functional across every cluster. A software fix was rolled out in December, and according to EA Technology it appears to be working but has introduced another, new issue.

It appears that the Esprit system has been deployed at a Technology Readiness Level lower than that expected for a trial as large as My Electric Avenue. This is of concern, since the development of the Esprit system is outside of the control of the MEA project team. Responsibility for Esprit development resides within another team at EA Technology, with the hardware and software sub-contracted to an independent technology provider.

Key risks for the next reporting period include:

- Further delay and disruption to the Technical Trial caused by more issues with the Esprit system
- Failure or issues with the various processes for data collection, verification and analysis leading to a reduced data set and jeopardising project learning

The delivery schedule for the socio-economic modelling (Task 6) has already been affected by the issues with Esprit. Further disruption would put this task at risk of not delivering the full project learning.

Highlighted Strengths

Throughout the customer recruitment and technology installation processes, the MEA team has demonstrated excellent abilities in managing the relationships with Technical and Social Trial participants.

There continues to be strong team coherence across the project consortium, with good project partner and sub-contractor engagement in project activities. This is contributing to good project deliverables, such as the first three reports from the University of Manchester, which demonstrate a professional approach following a logical structure with clear wording and good learning/conclusions drawn.

Recommendations

The Reviewers recommended the following areas for improvement in the next reporting period:

- Prepare and communicate the contingency plan to be implemented if there are further issues with Esprit that disrupt the Technology Trial
- Review the MEA database requirements, ensuring all requirements captured have been suitably recorded and shared with the project partners and subcontractors
- Identify the risks associated with data collection, analysis and the visualisation tools, and ensure appropriate mitigation controls are instigated. This applies to activities within Task 5 and Task 6
- Consider modifying the Esprit system functionality to allow threshold settings to be changed remotely
- Continue to improve document control, ensuring the previous recommendations are appropriately applied by all project partners and subcontractors

- Use an appropriate file sharing system to share project documents among the project consortium
- Consider carefully which documents to submit to the independent reviewers “for review” and “for information”

The Reviewers also made recommendations that are relevant to the next phase of development of the Esprit technology, or to future technology trial projects:

- Continue to improve the documentation associated with the Esprit technology and its design
- Improve the technology development processes used to deliver the Esprit system. For example, consider adopting a more systems engineering approach
- Include “Requirements Capture” and “Specification Setting” tasks at the beginning of the technology demonstration project

3 Response from EA Technology

3.1 Overall response

EA Technology is pleased that the independent review undertaken by Ricardo 24 months into the I²EV (My Electric Avenue) project has recognised the extensive customer engagement undertaken by the project. It is particularly gratifying that the strong team coherence between all project partners is acknowledged in relation to good, professional deliverables.

The deployment of the Esprit equipment has encountered issues delaying full implementation, although data allowing specific learning to be achieved has still been gathered. Specifically, monitoring of the phase currents through the Esprit Monitor-Controllers in combination with charging events recorded by the vehicles allows evaluation of the impact of charging on the network.

Since submission of documentation for the independent review, the final Monitor Controller installation in the Lyndhurst cluster has been completed.

The cause of the deterioration of communications between Esprit devices (the MC and associated ICBs) was identified to be due to software implementation of control signals and not due to the inability of the power-line carrier (PLC) medium to provide communications. Whilst identification of this, and subsequent resolution, took longer than would have been desired, the Esprit system is now functioning with data from connected ICBs demonstrating curtailment of EV charging as expected based on the threshold 'trigger settings' assigned to each cluster.

It is acknowledged that the software update aimed at preventing deterioration of communications has introduced another issue, albeit one that can be readily worked around; the process for this is currently underway.

The Esprit technology is not a product that is ready for commercial deployment. The My Electric Avenue (I²EV) project was envisioned to test the feasibility of wide scale deployment of such an approach to demand-side management (DSM). The deployment of the trial equipment in the project cluster is the first 'wide-scale deployment' of the technology, and consequently is identifying areas for improvement that were not apparent in the earlier tests².

The deployed technology is monitoring the feeder currents and implementing the curtailment of EV charging with evidence of the interrupted, delayed charging events recorded in the data being received from the equipment.

The project team remain confident, based on the data available and from discussions with project partners De Montfort University and the University of Manchester, that the project learning will be achieved.

3.2 Specific responses

Each of the specific recommendations made by Ricardo are titled below, with the relevant response from the project team explained accordingly. If the recommendation is not to be implemented, either in full or partially, an explanation is provided as to why this decision has been taken.

² For the avoidance of doubt, all improvements / development of the Esprit technology is funded entirely by EA Technology and not by the My Electric Avenue (I²EV) project.

- Prepare and communicate the contingency plan to be implemented if there are further issues with Esprit that disrupt the Technology Trial.
 - A contingency plan is already in place; this will be disseminated to all partners.
- Review the MEA database requirements, ensuring all requirements captured have been suitably recorded and shared with the project partners and subcontractors.
 - The specification of the database for storing and exporting the project data is under review.
- Identify the risks associated with data collection, analysis and the visualisation tools, and ensure appropriate mitigation controls are instigated. This applies to activities within Task 5 and Task 6.
 - We have identified risks associated with data collection and are currently working to mitigate these.
- Consider modifying the Esprit system functionality to allow threshold settings to be changed remotely.
 - The ability to remotely modify the internal functionality of the Esprit system would, at this stage, take longer than is feasible when considering the remaining duration of the project and so will not be implemented for use within the My Electric Avenue (I²EV) project. For future commercial implementation of Esprit, such an approach would be required.
- Continue to improve document control, ensuring the previous recommendations are appropriately applied by all project partners and subcontractors.
 - Measures recommended by Ricardo for improving document control will be implemented for formal documentation. Informal or internal project documents will adhere to the company's document control measures. This follows earlier consideration of the benefits such a system would provide, in comparison with the cost and resource required to implement it fully, which would need to be diverted away from core project activities.
- Use an appropriate file sharing system to share project documents among the project consortium.
 - The project implemented a file sharing system at the outset of the project in line with sharing customer information. A more comprehensive system may provide benefits to the project, however these benefits are reduced in view of the remaining duration of the project. As such, file sharing systems, in addition to that already in place, will not be implemented within the My Electric Avenue (I²EV) project.
- Consider carefully which documents to submit to the independent reviewers "for review" and "for information".
 - For future reviews, a final evaluation of the documentation prepared for submission will be undertaken prior to transfer, to ensure that only essential information is submitted for review, and additional material provided on an 'as requested' basis.

The Reviewers also made recommendations that are relevant to the next phase of development of the Esprit technology, or to future technology trial projects:

- Continue to improve the documentation associated with the Esprit technology and its design
 - EA Technology notes that further improvements can be made in relation to the Esprit technology documentation. As part of the planned decommissioning phase, particular focus will be made on documentation developed and completed by EA Technology, project partners and subcontractors.
- Improve the technology development processes used to deliver the Esprit system. For example, consider adopting a more systems engineering approach

- The team agrees that such a system would be beneficial for remaining improvements made to the Esprit system during the trial period. The My Electric Avenue team will pass this recommendation to EA Technology's development team and its subcontractor.
- Include "Requirements Capture" and "Specification Setting" tasks at the beginning of the technology demonstration project
 - EA Technology agrees that such documentation would be beneficial during Task 1 – initial background and evaluation of initial trial. The My Electric Avenue team will make these recommendations to EA Technology Development team.

4 Response from SSEPD

Scottish and Southern Energy Power Distribution (SSEPD) has reviewed this fourth independent review of the I2EV (My Electric Avenue) Project and agrees with the Reviewers' overall assessment. We are pleased to see that EA Technology's excellent customer engagement and relationship management abilities that were highlighted in the previous report have once again been evident in this reporting period and highlighted as a particular strength. We also recognise the good work EA Technology has carried out in maintaining the focus and commitment of the project partners and subcontractors. We stated in our response to the previous report that we would look for this level of rigour to be applied as the project moves into the next trial stage and we are pleased to see this has taken place and resulted in the successful completion of all recruitment activities.

The Reviewers previously noted that there could be consequences for the success of the Technical Trials should there be any further serious faults with the Esprit technology. Unfortunately as has been evident the redeployment of the Mark 2 ICBs caused a breakdown in equipment communications, and a software fix applied in December solved that particular communications issue however created a new one that limited the ability to monitor certain parameters. We appreciate the challenging management situation between EA Technology and their technology provider in trying to identify and resolve the issues, and recognise that EA Technology responded to our requests for network load analysis and a plan to provide suitable monitoring of the Technical Trials over the Christmas period.

It is encouraging to see signs of the Esprit technology operating successfully and curtailing EV demand charging based on thresholds set for each cluster, and we look forward to seeing the data collected in the next reporting period.

As a result we also agree with the key risks highlighted, and will be continuing to monitor progress in resolving outstanding issues and ensuring suitable mitigations are in place to ensure there are no further periods of disruption to or loss of project data, and the subsequent impact to project learning.

We have noted the recommendations for improvement in the next reporting period and accept how some of these will not be implemented due to the effort required to implement detracting from the core project objectives. The recommendations which will be actioned will be reviewed in the monthly project assurance meeting.

SSEPD would like to thank Ricardo for their independent review and recommendations for the project.