NIC Project UKPNEN03

Project Progress Report

December 2020

Optimise Prime

HITACHI Inspire the Next   Uber   Scottish & Southern Electricity Networks   centrica   Royal Mail   UK Power Networks

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Table of acronyms

Acronym	Full form
ANM	Active Network Management
API	Application Programming Interface
CAFE	Clean Air For Europe
CP	Charge Point
CPC	Charge Point Controller
CPO	Charge Point Operator
DAI	Data Analytics & Innovation
DNO	Distribution Network Operator
DSO	Distribution System Operator
EPN	Eastern Power Networks plc (one of UK Power Networks' three DNOs)
EV	Electric Vehicle
FSP	Full Submission Pro-forma
GB	Great Britain
GSA	Geospatial Analytics
IoT	Internet of Things
IP(R)	Intellectual Property (Rights)
IT	Information Technology
LCV	Light Commercial Vehicle
LV	Low Voltage
LPN	London Power Networks plc (one of UK Power Networks' three DNOs)
NIC	Network Innovation Competition
OEM	Original Equipment Manufacturer (in this context vehicle manufacturer)
OLEV	Office for Low Emission Vehicles
PH(V)	Private Hire (Vehicle)
PM	Project Manager
POC	Point of Connection
PPR	Project Progress Report
RAID	Risks, Assumptions, Issues and Dependencies
RMG	Royal Mail Group
SPN	South Eastern Power Networks plc (one of UK Power Networks' three DNOs)
SSEN	Scottish & Southern Electricity Networks
TOA	Trials Operational Applications
TCO	Total Cost of Ownership
TfL	Transport for London
UAT	User Acceptance Testing
UK	United Kingdom

Glossary of terms

Term	Definition
Trial Period	A 12-month period of trialling for each workstream when all trial vehicles are on the road.
WS1	Workstream 1 – Trial 1 – Home Charging
WS2	Workstream 2 – Trial 2 – Depot Charging
WS3	Workstream 3 – Trial 3 – Mixed Charging
WS4	Workstream 4 – IoT Platform, Network Forecasting & Flexibility Analysis
WS5	Workstream 5 – Business Model
WS6	Workstream 6 – Reports and Documentation
WS7	Workstream 7 – Project Management and Sharing Learning

1 Executive summary

1.1 Project background

Optimise Prime is an industry-led electric vehicle (EV) innovation and demonstration project that brings together partners from leading technology, energy, transport and financing organisations, including Hitachi Vantara, UK Power Networks, Centrica, Royal Mail, Uber, Scottish & Southern Electricity Networks, Hitachi Europe and Hitachi Capital.

The project will gather data from up to 3,000 EVs driven for commercial purposes through three trials. Optimise Prime will also implement a range of technical and commercial solutions with the aim of accelerating the transition to electric for commercial fleet operators while helping GB's distribution networks plan and prepare for the mass adoption of EVs. Through cross-industry collaboration and co-creation, the project aims to ensure security of energy supply while saving money for electricity customers, helping the UK meet its clean air and climate change objectives.

This project aims to be the first of its kind, paving the way to the development of cost-effective strategies to minimise the impact of commercial EVs on the distribution network. Commercial EVs are defined as vehicles used for business purposes, including the transport of passengers and goods. Compared to vehicles used for domestic purposes, commercial EVs will have a much greater impact on the electricity network. The potential impact of commercial EVs charging at depots results from two factors: co-location of multiple EVs at a single depot location, and higher energy demand per vehicle resulting from higher daily mileages and payloads. The latter is also a factor when commercial EVs are charged at domestic locations.

This project will seek to answer three core questions relating to the electrification of commercial fleets and Private Hire Vehicles (PHVs):

1. How do we quantify and minimise the network impact of commercial EVs?
The project will gain a comprehensive and quantified understanding of the demand that commercial EVs will place on the network, and the variation between fleet and PHV types. The project will achieve this through large-scale field trials where significant volumes of vehicle and network data will be captured and analysed. This data will enable the creation and validation of practical models that can be used to better exploit existing network capacity, optimise investment and enable the electrification of fleets as quickly and cheaply as possible.

2. What is the value proposition for smart solutions for EV fleets and PHV operators?
The project will gain an understanding of the opportunities that exist to reduce the load on the network through the better use of data, planning tools and smart charging. Additionally, the project will consider and trial the business models that are necessary to enable these opportunities. The project will achieve this by developing technical and market solutions, and then using them in field trials to gather robust evidence and assess their effectiveness.

3. What infrastructure (network, charging and IT) is needed to enable the EV transition?
The project will develop an understanding of how best to optimise the utilisation of infrastructure to reduce the load on the network. This will be achieved through the collection, analysis and modelling of depot-based, return-to-home fleet and PHV journey data. By answering these questions, the project will enable network operators to quantify savings which can be achieved through reinforcement deferral and avoidance while facilitating the transition to low carbon transport. The trial will also assess the vehicles' journey data to understand the charging and associated IT infrastructure requirements and implications for depot and fleet managers to be able to operate a commercial EV fleet successfully.

1.2 Purpose of this document

This is the third Project Progress Report (PPR) for the Optimise Prime Network Innovation Competition (NIC) project, covering the six-month period between 20 June and 18 December 2020. This document, together with the previous six-monthly report published in June 2020, fulfils the reporting requirements of Sections 8.11 – 8.15 of v3.0 of the NIC Governance Document. This document aims to keep project stakeholders informed on the progress and lessons learned from the Optimise Prime project.

1.3 Summary of progress

Optimise Prime has continued to make progress towards delivering the three trials throughout the last six months. Since the last report, despite the challenges posed by the COVID-19 pandemic, the project has largely overcome the challenges surrounding the delivery of sufficient EVs for the trials and is now on track to commence all of the trial periods by 1 July 2021. Previously paused development work has been re-started, and the project partners expect to achieve the deliverable dates communicated to Ofgem.

Over this period, the project has successfully:

- WS2 – Completed the commissioning of charge point controllers (CPCs), load monitoring and associated infrastructure at the majority of depots
- WS1 & 2 – Designed the approach for the trialling of flexibility potential from EV commercial fleets and produced an initial API specification for interfacing UK Power Networks' Active Network Management (ANM) system with Hitachi and Centrica's aggregator platforms.
- WS 2 & 3 – Commenced execution of trial experiments
- WS1 & 2 – Re-started development of the trials operational applications
- WS3 – Built models and conducted assessment of PH EV demand in the London area
- WS5 – Began work on scoping the Business Modelling workstream and its interface with the trials
- WS6 – Published the second project deliverable, Solutions Build Report – Lessons Learned, on 27 November 2020
- WS7 – Presented project progress at a number of virtual events including, The Virtual Fleet & Mobility Live 2020 and Cenex-LCV2020
- WS7 – Managed the programme, its risks and finances.

In addition, the project's partners have made significant progress in procuring vehicles:

- WS1 – Centrica announced an order on 7 July 2020 for 1,000 Vauxhall e-Vivaro vans, to be deployed throughout the UK. This was the largest single order for electric vans to date in the UK. The first 15 have been delivered and are now expected to be ready for drivers in December 2020. Charge points (CPs) have been installed at over 90 homes (c.20 in the UK Power Networks and SSEN areas), with 132 expected to have been installed across the UK by the end of December.
- WS2 – Royal Mail is now operating 226 EVs in London and is now considering whether a small number of additional EVs can be added to the seven depots involved in the project.
- WS3 – Following a slowdown in demand earlier in the year, as a result of the COVID-19 lockdown, the number of Uber EVs in use in London has rebounded. The project started the WS3 trial period in August 2020 when the target of 1,000 Electric PHVs on the road was met. The number of EVs in WS3 continues to grow steadily.

Key progress from each project workstream is highlighted in the following sections.

1.3.1 WS1, 2 & 3 – The Home, Depot and Mixed Charging Trials

In WS1 (Home Trials), Centrica placed an order for 1,000 Vauxhall e-Vivaro vans in July 2020. Following this announcement, the company has made good progress in installing the required charging infrastructure at drivers' homes with 90 units now in place and 132 expected to be installed by the end of December throughout the UK. The first 15 EVs have been delivered and will be ready for drivers during December 2020. All of the EVs are expected to be on the road by summer 2021. Centrica has also made good progress in developing and testing a driver app for charger control, developing the charging management system and working with Hitachi and UK Power Networks to detail the design of flexibility services to be trialled and data exchange.

In WS2 (Depot Trials), 226 EVs are now operating from seven Royal Mail sites. Hitachi has worked closely with Royal Mail to commission the CPCs, and site load monitoring at these depots. Hitachi has completed the development of the data ingestors, which capture information from the charging points, the vehicle telematics systems and load monitoring systems, in order to carry out the trials. The trials team has completed several initial executions of experiments and project data scientists have analysed the data sets to better understand the behaviours of Royal Mail's fleet.

Work has begun on the web based 'site planning tool' which looks to operationalise the depot planning modelling work started last year. This tool will allow a user to create a site and add in the operational characteristics of this site, in order to produce a 'profiled connection' application, ready for discussion with Distribution Network Operators (DNOs).

UK Power Networks have designed the three flexibility products that will be used in WS1 and WS2 trials to test the flexibility response of EV commercial fleets.

In WS3 (Mixed Trials), Uber has continued to collect and anonymise trip data from EVs on their platform and has provided data to November 2020. UK Power Networks and SSEN have been collating utilisation data of their secondary substations for the London Power Networks area and in West London respectively. The WS3 trial period began in August 2020 when Uber reached the target of over 1,000 EVs on the road. Hitachi data scientists have carried out a number of trial executions, based on the data, and have shared initial findings with Uber and UK Power Networks. Further to the initial analysis carried out by Hitachi, UK Power Networks have extended their network capacity and utilisation datasets to areas of Eastern Power Networks (EPN) and South Eastern Power Networks (SPN) where a high volume of Uber trips is experienced. Work continues to further analyse the data and to develop models in order to derive charging patterns and predict the impact of further EV growth.

During this period, the Optimise Prime partners have had over 1,400 EVs on the road in the UK Power Networks and SSEN regions. A breakdown of EV numbers by workstream can be found in Confidential Appendix A.

1.3.2 WS4 – IoT Platform, Network Forecasting & Flexibility Analysis

During this period, the WS4 team has primarily focused on developing the interfaces between the project platform and the data sources required for the applications and trials. This work is now substantially complete, and the Hitachi data science team has been ramped up, in order to analyse the data produced by the trial workstreams.

The Trials Operational Applications (TOA) work restarted in early September, and progress has been made in the detailed design and development of the trial applications, including depot management front end, optimisation interfaces, flexibility and trials management.

UK Power Networks have continued to work with Smarter Grid Solutions to develop the ANM functional requirements specific to Optimise Prime trials WS1 and WS2. Rescheduling of the implementation of London Power Networks' (LPN) ANM system (outside of the scope of this project) has raised some potential risks regarding this functionality and UK Power Networks is in the process of developing mitigating measures including utilising the ANM system deployed in a cloud environment.

The work to plan and test the 'end-to-end' functionality of the system has begun as part of our on-going quality assurance plans.

1.3.3 WS5 – Economic Analysis & Business Models

The Economic Analysis & Business Models workstream has created the first draft of a High-Level Total Cost of Ownership (TCO) model which is currently under review and will be validated once the trials have begun. Planning has begun on scoping the business model work that will accompany the trials, including a study of driver behaviour.

1.3.4 WS6 – Reporting & Deliverables

Deliverable D2, "Solution build report – lessons learned", was published on 27 November 2020.

1.3.5 WS7 – Project Management & Sharing Learning

The project management function has continued to manage Optimise Prime's project plan, budget, and resources throughout this reporting period.

All partners' contracts have been updated to reflect the up to one year extension of the project which was notified to Ofgem on 20 February 2020.

The Design Authority has continued to support the other workstreams by managing the design of the platform and application elements of the project.

Despite the disruption caused by the COVID-19 pandemic, engagement with stakeholders has continued throughout this reporting period, including presentations to events including Cenex-LCV2020 and The Virtual Fleet & Mobility Live.

1.4 Risks and issues

The project operates a robust risk management process in order to reduce the probability of risks occurring and lessen the impact of any issues upon the project. The full risk register can be found in Section 0.

One of the major risks facing the project has been as a result of Transport for London (TfL)'s decision, in November 2019, not to renew Uber's PH operator licence in London. On 28 September 2020 Uber was granted a new licence, alleviating this risk.

The take up of EVs continues to be heavily influenced by the regulatory environment. During this period changes were made to the London Congestion Charge scheme – which was initially paused and then extended to cover evenings and weekends. The impact of this change on the project remains to be seen.

Up to this point the primary issues facing the project has been enrolling sufficient EVs in the project to run the trials and the impact of COVID-19.

On 5 June 2020, the Project Board agreed that Optimise Prime should revise the targeted trial volumes in order to ensure that the trials can be delivered in a timely and cost-effective way, while maintaining 'statistical significance' and delivering the promised learnings. It was also agreed that vehicles based outside of the UK Power Networks and SSEN areas could be included in some parts of the trials. The project has now met the statistically significant minimum EV targets within the UK Power Networks and SSEN areas in WS2 and 3. In WS1 Optimise Prime is confident of exceeding the minimum required vehicle volume across the extended trial area, and is aiming to meet the minimum requirements within the UK Power Networks and SSEN areas, subject to Centrica's operational constraints. Following this decision, and the subsequent placing of an EV order by Centrica in WS1, this issue is now closed.

The spring 2020 lockdown caused by the COVID-19 pandemic resulted in a reduction in demand for PHVs and a knock-on impact on the number of EVs active, and the pattern of journeys, on Uber's platform. The ongoing situation is fluid, and developing circumstances may cause further impacts that require us to pause the Uber trials or alter our analytical approach. In addition, the project team continues to primarily work remotely. While this has been effective, developing the technology design without the aid of in-person workshops and brainstorming sessions has been a challenge.

There are no other major issues active at this time. However, the project continues to monitor and manage a range of risks, including:

- The reliance of the project's methods on the integration of a number of third-party systems, and the potential impact of changes made to those systems.
- The requirement to deploy an alternative monitoring solution at the metering point of the Royal Mail sites and integration work required to transfer the real-time measurements to UK Power Networks' ANM system hosted in a cloud environment in order to implement profiled connections.
- The requirement to manage project budgets carefully in order to deliver the extended project.

1.5 Project Learnings

Optimise Prime is still at an early stage in its development, and it is expected that the majority of the project learnings will materialise after the trials have begun.

In WS2, Optimise Prime has assessed the Royal Mail fleet operational schedules which will allow us to plan the smart charging regime according to actual EV movements. In WS3, some early conclusions have been reached on where demand for PH EV charging is in the London area.

As the project has started to gather data from numerous systems operated by third parties, it has become increasingly apparent that there is a risk that configuration changes made by these third parties may inadvertently impact upon project systems and processes. Where these third parties do not have any contractual obligations to the project, close collaboration and monitoring is needed to anticipate any issues and respond to them as quickly as possible to avoid disruption to data gathering or control of charging.

The testing of CP control systems has also brought to light the issue of CPs behaving differently from each other – e.g. not responding to control messages in the expected way or offering different granularities of CP control. Optimise Prime is working closely with a CP supplier to try and resolve these issues. The project will carry out comprehensive testing of the 'end to end' solution, especially when integrating CPs that were not originally planned to be operated smartly.

Optimise Prime continues to generate learnings with regards to the factors that are driving and influencing the EV transition for commercial fleets and early analysis of project data has also generated learnings with regards to the utilisation patterns of our partners' fleets. More detail on project learnings can be found throughout Section 2 of this report.

2 Project Manager's report

2.1 Progress in this reporting period

Despite the ongoing challenges caused by the COVID-19 pandemic, the project has made significant progress during this reporting period and is currently on track to meet the timelines communicated to Ofgem. In summary, key achievements include:

- WS1-3 – Following agreement by the Project Board to adjust the targeted number of EVs in each trial to a statistically significant number, and Centrica placing an order for a fleet of EVs, the project is now on track to achieve the revised EV targets
- WS1 – CPs have been installed at the homes of the first 90 British Gas drivers, with 15 EVs having been delivered by Vauxhall, ready for roll-out during December.
- WS2 – The commissioning of the CPCs at the WS2 Depots has been completed and load monitoring systems have been installed at six out of seven depots, with completion of the final site due shortly.
- WS1-2 – The approach to delivering and testing flexibility services within the trials has been designed and an API specification for interfacing UK Power Networks' ANM system with Hitachi and Centrica's aggregator platforms has been produced
- WS1-3 – The execution of experiments has commenced in each of the three trials. In the WS3 trial, the initial trial period has begun as there are now over 1,000 EVs on the road
- WS4 – The data ingestion and management capabilities of the project's IT platform are now substantially complete and the project is collecting vehicle, charging and other data from a number of sources
- WS1-4 – The development of the applications, which had been temporarily paused, has resumed. Detailed design and development of the depot management, site planning and flexibility systems is underway
- WS5 – The business model workstream has continued to progress. During this period it has focussed on designing the behavioural research and planning the workstream's activities during the trials
- WS6 – Deliverable D2, 'Learnings from the solution build phase' has been completed and published
- WS7 – The project has presented progress and findings at a number of virtual events, including The Virtual Fleet & Mobility Live and Cenex-LCV2020.

Each of these items is considered in detail in the relevant sections of this report.

2.1.1 Project Partner meetings

Optimise Prime has continued to operate a project steering board, comprising all project partners on a quarterly basis. During this period meetings have been held on 4 September and 4 December 2020.

In addition, a weekly project progress reporting process has been put in place between Hitachi Europe, Hitachi Vantara, Royal Mail, Centrica, and UK Power Networks, and a monthly meeting with Uber and SSEN. All project partners contribute to the Optimise Prime workstreams.
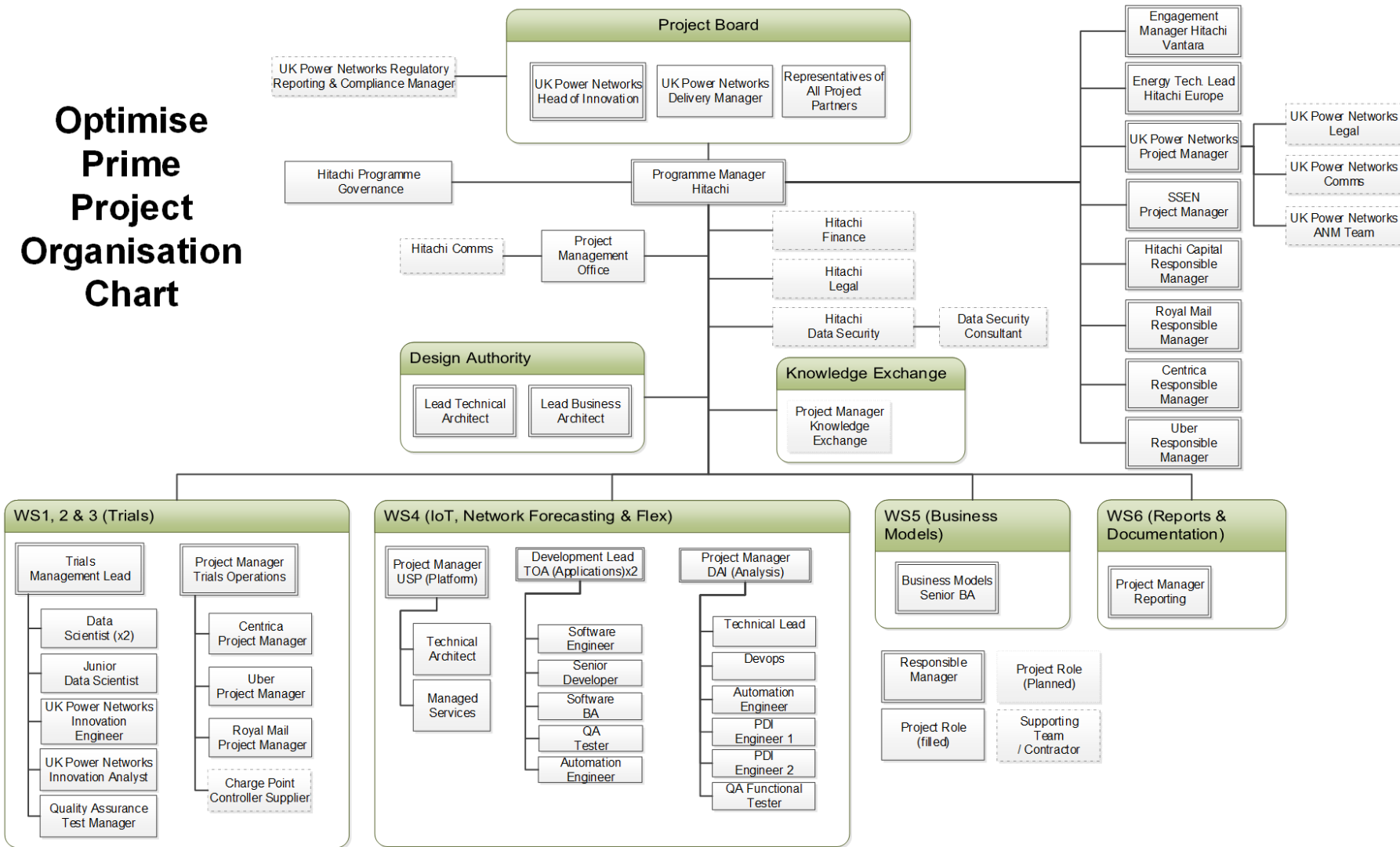
Optimise Prime Project Organisation Chart

Figure 1 – Optimise Prime Organisation Chart

2.1.2 Project team

Optimise Prime has continued to maintain a project team of specialists throughout this reporting period, supported by the project partners, as shown in Figure 1. During this period, the TOA development team has been ramped back up to deliver applications (following a six month pause to give time for EVs to be ordered) while part of the Data Analytics & Innovation (DAI) team has started to ramp down following the completion of the underlying technical infrastructure and data interfaces. An additional data scientist has joined the Trials team to support analysis, a workstream lead for business models has been appointed and a quality assurance test manager has joined the team.

The project sponsors at Royal Mail, Hitachi Vantara and Hitachi Capital Vehicle Solutions have changed as a result of internal reorganisation. The new sponsors are being regularly engaged with and have joined the quarterly project board calls in order to gain a full understanding of project progress.

2.2 Workstream progress

2.2.1 WS1, 2 & 3 – Home, Depot & Mixed Trials

These workstreams are responsible for the design and implementation of the Optimise Prime's three trials: home, depot and mixed charging.

2.2.1.1 WS1 – Home trial

The home trial, outlined in Figure 2, is implementing technologies to monitor and manage commercial EVs charging at home, as well as testing their ability to provide flexibility services.
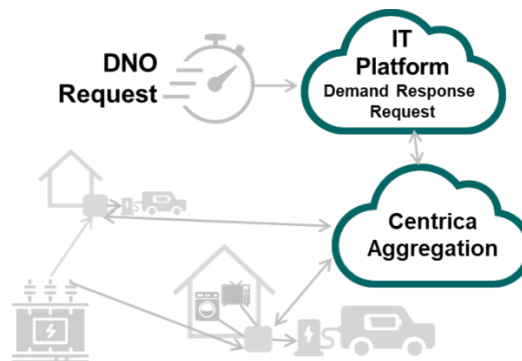

Figure 2 – Schematic of WS1 trial

In the home trial, Centrica has progressed the following activities:

EVs – Placed an order for 1,000 Vauxhall e-Vivaros (
- Figure 3) to be used by British Gas throughout the UK and planned the rollout of the new EVs to drivers. The first 15 vehicles have been delivered and will enter service during December
- **CPs** – Began the installation of EV charging infrastructure at drivers' homes, installing devices at over 66 locations (12 in the UK Power Networks and SSEN areas)
- **Technology** – Trialled and launched a driver app as part of the CP control solution
- **Flexibility** – Designed the solutions for the control of charging in response to flexibility requests, and for reimbursement of charging costs to drivers

- Contributed to the design of the flexibility aspects of the project trials, together with UK Power Networks and Hitachi
- **Data** – Provided telematics data and interface detail to Hitachi for use in analysis and worked with Hitachi to develop the ongoing process to capture charging and telematics data.

Figure 3 – British Gas Vauxhall e-Vivaro order announcement

UK Power Networks has:
- Further developed the requirements of the ANM system necessary for the trial of flexibility services provision
- Produced an API specification for exchanging data between Centrica and Hitachi's aggregator platforms and UK Power Networks' ANM system
- Defined the three flexibility products that will be used in the trial to generate learnings regarding availability, value and reliability of flexibility procured by commercial EV fleets
- Together with Hitachi, Royal Mail and Centrica, defined the implementation details of these three flexibility products in Optimise Prime trials.

Hitachi has planned the experiments for the WS1 trial in detail and has worked with both UK Power Networks and Centrica to design and implement the technology necessary to capture data for trials analysis. Execution of the first experiments, focused on creating a baseline from ICE vehicle data, is scheduled to start in January 2021.

2.2.1.2 WS2 – Depot trial

The depot trial, shown in
Figure **4**, is implementing a range of technologies to allow depots to electrify economically by putting minimum additional peak load on the distribution network. Activity in this workstream has included the commissioning of the charge control and load monitoring systems, the development of the trial applications and the start of trial activities.
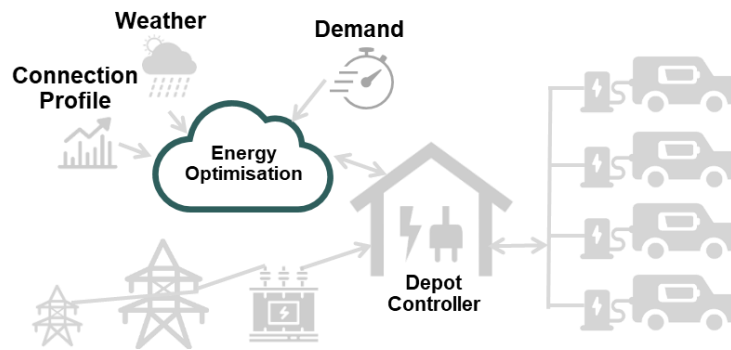
Figure 4 – Schematic of WS2 trial

In the depot trial, Royal Mail has:

- Continued to operate their fleet of EVs
- Installed load monitoring systems at six out of seven trial depots
- Supported Hitachi in implementing the CP control system
- Contributed to the analysis of the pre-trial experiments

**Figure 5 – Charging infrastructure at Royal Mail depots
(existing CP, left; newly installed CP, right)**

Hitachi has progressed the following activities:

- **CPCs** – Commissioned CPCs at the seven Royal Mail depots
- **Testing** – Carried out testing at the Hitachi test site
- **Telematics** – Developed the capabilities needed to capture data from Royal Mail's telematics systems and the load management platform
- **Development** – Restarted development of the trials applications that will control depot charging based on optimisation and flexibility requests, following the pause in activities awaiting confidence in availability of statistically significant number of EVs.
- **Depot planning** – Utilised the Depot Planning Model to analyse the potential impact of adding further EVs to the existing Royal Mail depots and adding further depots to the trials
- **Site planning tool** – Planned the transition of the Depot Planning Model to a web-based Site Planning Tool, enabling its use by depot managers.
- **Experiments** – Carried out a number of pre-trial experiment executions, including:
  - Experiment 1 – Predicting and validating the aggregated depot load profiles of 'unmanaged charging' EVs based on analysis of ICEV data
  - Experiment 2 – Predicting and validating the aggregated depot load profiles of 'smart charging' EVs based on analysis of ICEV and unmanaged charging data

              o Experiment 4 – Predicting depot load profiles based on the degree of electrification of the fleet and the charging mode adopted
- The execution of the above experiments has allowed the project to develop a greater understanding of the EV operations (collection and deliveries) of Royal Mail depot. This has enabled the creation of a baseline to compare charging events against and has enabled the development of smart charging and cost minimisation logic.

Within this reporting period, UK Power Networks has conducted the following activities:

- **Profiled connections** – Further refined the profiled connection process, defined the detailed ANM system specification to meet the trial requirements and established the network monitoring solutions required to implement the profiled connection offering
- **Testing** – Completed User Acceptance Testing (UAT) sign-off of the profiled connection assessment add-on functionality to UK Power Networks' existing network planning tool
- **Flexibility design** – Defined the three flexibility products that will be used in the trial to generate learnings regarding availability, value and reliability of flexibility procured by commercial EV fleets
- **Flexibility implementation** – Together with Hitachi, Royal Mail and Centrica, defined the implementation details of these three flexibility products in Optimise Prime trials.

Within this reporting period, SSEN worked with UK Power Networks to peer-review the profiled connection and flexibility methodologies.

2.2.1.3 WS3 – Mixed trial

The mixed trial, shown in Figure 6, collects anonymised trip data from PHVs in the London area and analyses this data to forecast future charging demands and network impacts.

In the mixed trial, Uber has progressed the following activities:

- **Data** – Provided anonymised EV trip data to Hitachi on a monthly basis
- **Technology** – Continued to add additional EV drivers to their platform, reaching the target of 1,000 EV drivers within Greater London in August 2020
- **Experiments** – Provided feedback on the results of initial data analysis based upon knowledge of Uber vehicle operations.

Outside of the scope of Optimise Prime, Uber continued to operate its Clean Air Plan helping drivers upgrade to EVs and as part of this activity has developed cooperation with vehicle suppliers and CP operators. Uber has also announced a £5m fund for the installation of charging infrastructure in London
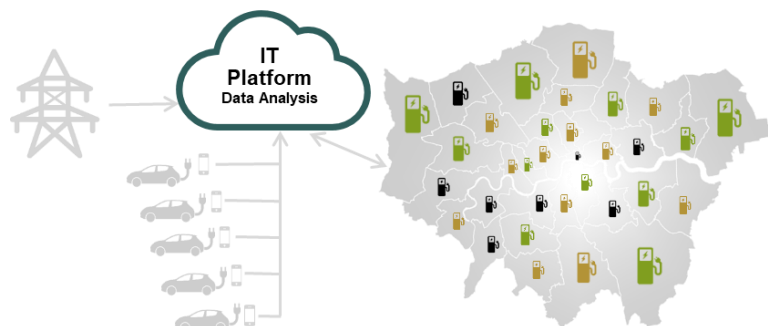

Figure 6 – Schematic of WS3 trial

UK Power Networks has progressed the following activities:

- **Network data provision** – Together with SSEN, provided maximum load data from secondary substations across their network in Greater London for use in the analysis
- **Data geographical extension** – Further to the initial analysis of Uber journeys carried out by Hitachi, extended network capacity and utilisation datasets to areas of EPN and SPN where a high volume of Uber trips is experienced
- **Data quality** – Established a methodology to filter site dedicated substations out of the network dataset. A dedicated substation is a substation that provides a supply to a single site, and does not supply other customers than the dedicated site customer(s) via the wider Low Voltage (LV) network. This filtering was done by removing substations with a minimal number of customers connected
- **Data sources** – Considered what additional network data may be available to enable more robust analysis of network impacts.
- **Experiments** – Reviewed and provided comment on the outcomes of the initial analysis and trial executions

Hitachi has progressed the following activities:

- **Data** – Continued to capture, quality check and store the data from Uber and CP location database Zap-Map.
- **Experiments** –
  - Developed methodologies to derive estimated charging patterns from Uber's journey data
  - Carried out initial analysis of charging behaviour and patterns, and potential impact on the distribution network and reviewed this with Uber and UK Power Networks
  - Carried out a number of pre-trial experiment executions, including:
    - Experiment 1 – Estimation of PH EV charging events
    - Experiment 2 – Analysis of external factors on PH EV charging
    - Experiment 4 – Analysis of locations for new charging infrastructure
    - Experiment 5 – Analysis of EV impact on the distribution network
  - The outcomes from the above experiments have been used to improve future trial executions through the further development of data models and logic.

2.2.1.4 Challenges & lessons learnt (all trials)

As the project has continued to build and implement systems, while embarking on the initial trials experiments, Optimise Prime has encountered a number of challenges arising both from the varying requirements of project partners and the impact of external factors and events.

Vehicle acquisition
While the project is forecast to meet its revised targets for vehicle acquisition, discussions have continued with a number of potential participants for the trials. Through these discussions, it has emerged that many fleets currently implementing commercial EVs are not implementing a traditional 'depot based' model, as is being studied in WS2, but are operating, or planning to operate hybrid models with some depot charging and some vehicles returning to drivers' homes to charge. Optimise Prime will consider the potential impact of such hybrid models through its business modelling work and may, if resources allow, carry out data-based analysis with additional partners in order to enhance the project's findings.

Definition of flexibility products
While the project has made good progress in this period in the definition of the flexibility products and processes, the project partners believe, on reflection, that scheduling this activity earlier in the project design work would have been beneficial. A number of aspects of the application design work in WS1 and 2 are dependent on the completion of this activity and could have proceeded more quickly if the approach to flexibility had been agreed earlier.

Reliance on third parties for data acquisition

The project experienced loss of connectivity to the Royal Mail CPs, following a third party upgrading the data connection process. This took about a month to resolve, and a new process has been put in place to reduce this dependency. It has highlighted how, in some areas, the project is reliant on the business as usual processes of the partners and their suppliers in order for the trials not to be disrupted. This requires the project to tightly manage and monitor the data interfaces, because there are no contractual obligations between Optimise Prime and the partners third party suppliers.

Network monitoring solution

The implementation of the profiled connection requires the point of connection (POC) of the Royal Mail depots to be monitored to ensure the sites adhere to the agreed profile. The majority of the Royal Mail depots are LV connected and while some sites are served via dedicated feeders or onsite substations others are not, requiring a specific monitoring solution to be installed at the metering point within the customer's site. This has led to additional time and effort to determine a suitable LV monitoring equipment to be identified. The project will accelerate the deployment of network monitoring solutions to meet the trial timelines.

2.2.1.5 Outlook for the next reporting period

During the next reporting period, the trials workstreams will focus on:

- Completing the installation of the EV charging infrastructure for WS1 homes and the roll out of vehicles
- Confirm whether additional vehicles and/or depots will join the WS2 trials
- Completing the development of the applications required by the WS1 and WS2 trials
- Delivering the network monitoring solution required to implement the profiled connection offering on the depot trial sites
- Finalising the development of changes to UK Power Networks' systems to accommodate profiled connections and flexibility services from EVs
- End-to-end testing of all trial systems and processes
- Continued capture of data from project vehicles and chargers
- Continuing initial experiment executions across WS 2 and 3 and starting experiments in WS1
- Analysing data arising from pre-trial activities
- Continued refinement of trials design, flexibility design and the profiled connection methodology to demonstrate successful use of profiled connections
- Detailed planning of the WS1 and WS2 trials, based upon findings from the initial trials.

2.2.2 WS4 – IoT Platform, Network Forecasting & Flexibility Analysis

This workstream is responsible for the delivery of the Optimise Prime IT platform and the use of the platform to provide analytics resources and services to the trials. WS4 supports WS1 and WS2 through the development of the Trials Operational Applications (i.e. the Depot Planning Model, depot optimisation system and flexibility services). WS4 also supports WS3 through the development of the data analysis capability.

UK Power Networks will develop the capability, within their systems, to receive and process profiled connection applications and manage the provision of flexibility services as part of this workstream. Additionally, options to best utilise the full dataset from the project for specific use cases in UK Power Networks' existing Geospatial Analytics (GSA) tool will be explored and may require modification depending on the specific requirements.

2.2.2.1 Progress during this reporting period

This workstream has continued to make good progress during this period, managing the day-to-day operation of the IT platform, developing the data ingestors, analytical tools and trials applications. Main activities have included:

- **Data** – Substantial completion of the 'data ingestors' which capture data from telematics and charging systems, partners' systems and other sources, such as weather and CP location data. Data from all currently available systems is now being captured, though some further improvements will continue.
  - o Capturing data from Uber, Royal Mail, Centrica and external sources, performing analysis in support of WS1, 2 and 3.
- **Depot control** – Developing and testing the capability needed to control charging in Royal Mail depots
- **Team** – Ramping up the Trials Operational Applications team, following the decision to resume work
- **Design** – Detailed design and development of the depot management, flexibility management and site planning applications
- **Data science** – Expanding the Data Analytics capabilities to accommodate the growing data science team
- **Security** – Continued to run regular security working group meetings to maintain the security of the system

In addition, UK Power Networks has continued to define the detailed requirements and use cases for the ANM system to facilitate the trial of profiled connections and flexibility services.

2.2.2.2 Challenges & lessons learnt

Suspension of WS1 and WS2 activity
The key challenge faced by the workstream in this period has been managing the ramp up of the development team. This has been achieved through use of the project's collaboration and work management tools as well as reallocating staff between the DAI and TOA workstreams.

Delays to UK Power Networks' ANM implementation in the LPN region
A delay in the development of the UK Power Networks' ANM system, which is being developed as part of a business funded activity, has created a challenge for the project. While the ANM system is being deployed in the SPN region, the implementation of the ANM system in the LPN region has been delayed (six out of the seven Royal Mail depots are based in the LPN region) and is not expected to be deployed in time to meet the timelines of the formal trials. To mitigate this risk, the ANM system based in a cloud environment which has also been developed as part of a business funded activity will be utilised in delivering the profiled connection and flexibility services trials. There is no impact on the quality of the outcome, a scope of works required for migration once the ANM system has been deployed in the LPN region has been identified and a delivery plan will be developed.

Control of legacy CPs
Technical challenges have included encountering some issues with successfully controlling the power delivered by legacy CPs in the required granularity. This has been resolved through working collaboratively with the CP manufacturer and applying appropriate firmware updates.

Implementation of solutions interacting with third party systems
The project's data gathering and depot management solutions interact with a number of third party systems in order to control, or collect data from existing infrastructure. Changes to the settings of data format by these third parties or their suppliers can have unexpected impacts

on trial systems. Where this has occurred, changes have been implemented to restore affected systems and prevent reoccurrence. While such situations cannot entirely be avoided, monitoring has been put in place to warn of any disruption to processes.

2.2.2.3 Outlook for the next reporting period

Over the next reporting period WS4 will focus on:

- Supporting the analytics required for WS1, 2 and 3
- Continuing to maintain and develop platform capabilities in line with trial requirements
- Completing the development of the trials operational applications
- Testing the applications through initial experiment executions
- Completing the development of changes required to UK Power Networks' ANM system.
- Developing use cases to best utilise the full dataset from the project and producing a delivery plan for the development of UK Power Networks' GSA tool.

2.2.3 WS5 – Economic Analysis & Business Models

This workstream is responsible for further developing the business case that was put forward in the FSP, in addition to business models that will help speed up the transition to EVs for commercial fleets. This business case will consider cost savings, behavioural analysis and improving use of capacity. It will also study the TCO impacts of the project methods and make recommendations on use of these methods by both vehicle operators and DNOs to reduce the cost and impact of the transition to EVs.

During this reporting period this workstream has continued to develop the high-level TCO model that will be tested during the trials. The review of this document has taken longer than originally planned, due to the reprioritisation of tasks as a result of the project extension; however, this delay has not impacted on the overall project plan. A scope for future business modelling work has been drafted, including a design for behavioural aspects of the work.

2.2.4 WS6 – Reporting & Deliverables

This workstream is responsible for the creation of the project deliverables that are published and submitted to Ofgem in line with the Project Direction.

During this period WS6 has compiled and published, detailing the lessons learned from the solution build stage of the project, in addition to this PPR. All future Optimise Prime deliverables remain on track and their status can be found in Section 6.

During the next reporting period WS6 will begin preparation of Deliverable D3, Learnings from installation and commissioning.

2.2.5 WS7 – Project Management & Sharing Learning

This workstream is responsible for the overall management of the Optimise Prime project and its Partners, ensuring the project delivers to time, scope and budget. WS7 also incorporates a project Design Authority and knowledge exchange activities.

The Design Authority is responsible for managing the overall architecture of the project's systems, as well as reviewing the trial designs and ensuring that the design of the applications and analytical services meet the requirements of the trials.

2.2.5.1 Progress during this reporting period

During this reporting period, the workstream focused on the following activities:

- **Status & governance** – Running the project's governance and producing regular project status reports
- **Planning** – Maintaining the detailed project plan and budget
    - o Updating the project plan and budget to reflect the resumption of activities in WS1 and 2
- **Contracts** – Re-profiling the payment schedules of the project partners to reflect the extension of the project timeline and signing off relevant amendment agreements.
- **Resourcing** – Supporting the resourcing of the TOA and data science teams
- **Risk management** – Maintaining the project Risks, Assumptions, Issues and Dependencies (RAID) log, including liaising with stakeholders regarding COVID-19 related risks
- **Status meetings** – Chairing weekly project update meetings with workstream leads and Project Partners
- **Design Authority** – Providing the design authority function for WS1-4
- **Security Working Group** – Convening the Security Working Group and implementing the information risk management system
- **Deliverables review** – Reviewing the deliverables of the other project workstreams
- **Communications** – Maintaining the project website, www.optimise-prime.com
- **Shared Learning** – The planning of conference speaking engagements and dissemination events. Further details of these can be found in Section 8.

2.2.5.2 Challenges & lessons learnt

COVID-19 has continued to create a great deal of uncertainty and continues to do so. The pandemic initially impacted the project on a number of fronts, including restricting ability to visit depots to complete WS2 commissioning, disrupting EV supply chains and impacting on the businesses of the project partners. As working practices have adapted to the restrictions of COVID-19 all activities have resumed. Hitachi and UK Power Networks continue to monitor any impacts on the project and have a COVID-19 specific risk log in place.

2.2.5.3 Outlook for the next reporting period

The project management workstream will continue to manage Optimise Prime in the next period in line with the established governance procedures. Over this time the project is expected to transition from the build and test phase to a position where the WS1 and WS2 trials can begin.

As the project's experiments start to generate learnings of interest to the industry the workstream will continue to develop and manage a programme of dissemination activities.

2.3 Business case update

At this stage, the project has not become aware of any circumstances that may significantly impact upon the business case that was submitted in Optimise Prime's FSP.

It is expected that there will be impacts on EV take-up as a result of vehicle availability, the effect of COVID-19 and policy changes, including the UK Government's announced end of petrol and diesel car sales in 2030. The longer-term outlook for EV transition has not changed in a way that would adversely affect the project outcomes.

The Optimise Prime business case will be regularly re-assessed as more data becomes available or changes occur that require a review of the original assumptions.

3 Progress against plan

This section of the report summarises the progress the project has made throughout this reporting period, highlights changes made since the FSP submission and reports issues faced by the project.

3.1 Detailed progress in the reporting period

At the end of the previous reporting period, in June 2020, the project board made the decision to revise the EV numbers required for the trials. Following on from this decision, and the confirmation of an EV order by project partner Centrica, work on the applications supporting WS1 and 2 has resumed. Work has also continued to complete the physical and data infrastructure required for the WS1 and 2 trials. At present the project is on target to start the trial period in July 2021. In advance of this, initial trial experiments have begun to help build baselines for comparison and to allow the project to further refine the trials methodology.

WS3, mixed trials, has continued to make excellent progress. The project is now collecting data relating to the journeys of over 1,000 EVs in this workstream and, as a result the formal trial period started in August 2020. The data analysis team has carried out initial analysis of the data collected and has developed models to derive charging activities from vehicle behaviour.

Table 1 details the status of key project activities expected in this reporting period:

Table 1 – Key Project Activities planned within the current reporting period

Task name	Sub-activities	Status at end of period
Trials (WS1, 2 & 3)		
Design trial	Detailed design of the trial experiments	Trial methodology and schedule development has progressed and an update was published in Deliverable D2.
Execute initial trial experiments		Experiments have begun in WS2 and 3
WS1 Home trial		
Confirm EV rollout (Home trial)		Centrica has confirmed their EV order. The rollout is ongoing.
Home trial charging technology rollout		Centrica has installed chargers at 90 homes and this process is ongoing
Implement trial technology solution	Driver app	Centrica has created and is testing an app to allow drivers to control charging
	System integration and testing	Centrica is developing its solution and the links with UK Power Networks and Hitachi systems
WS2 Depot trial		
Depot Infrastructure & CPCs commissioning	Implementation of EV charging infrastructure at depot sites	Stage 2 commissioning of CPCs complete. Customer side load monitoring installed at six of seven depots
Confirm EV rollout		226 Royal Mail EVs are now in use.
Trial depot planning model	Analysis of Royal Mail depots	Depot planning model utilised to model additional Royal Mail

Task name	Sub-activities	Status at end of period
		depots and addition of EVs to existing trial depots
WS3 Mixed trial		
Confirm EV rollout (Mixed trial)		In progress. Over 1,000 EVs are now on the platform
Data capture and analysis (Mixed trial)	Capture of data from Uber vehicles	In progress, on schedule
	Analysis of data from Uber vehicles	In progress, on schedule
Trial Period		The trial period for WS3 began in August 2020
WS4 IoT Platform, Network Forecasting & Flexibility Analysis		
Analytics platform – develop & test	Detailed design and build of the analytics platform	Complete
	Build of data ingestors	Substantially complete. Some further work may be required to integrate flexibility related systems.
Depot Planning & Optimisation Systems	Design and Build	Work has re-started and is on schedule for the WS2 trial start.
ANM modification	Detailed requirements specification capture and establishing a programme of works for Phase 2 (Build & Test)	Complete and Phase 2 is expected to start in December 2020/January 2021
WS5 Business Model		
High Level TCO Model	Draft model	Model drafted, review ongoing.
WS6 Reporting & Deliverables		
Deliverable D2	Compile deliverable	Completed and published
PPR December 2020	Compile report	Completed and published (this report)
WS7 Project Management & Sharing Learning		
Depot tools/systems requirements and design	Detailed design	Ongoing in support of solution development
Network Flexibility Model Requirements and design	High level design, define flex products	High level design completed. Detailed technical aspects being finalised
Dissemination Events	Present at events to update on project progress and learnings	Events held, see Section 8
Website design and build	Maintain website	Ongoing
Project management	Maintain project plan and budget	Ongoing
	Project reporting and governance	Ongoing

3.2 Summary of changes since the previous PPR

Since the FSP there have been no material changes, as defined in the NIC Governance document v3.0.

A summary of the project plan is shown in
Figure 7. Since the previous PPR the following non-material changes have been made:

- Tasks relating to the acquisition and integration of new project participants in WS1 and WS2 have been removed from the plan, as they are no longer necessary to meet the project's EV targets.
- UK Power Networks has agreed with Hitachi to change some budget allocations between workstreams in order to better align resources to project activities. This has primarily resulted in funding originally budgeted for project management (WS7) being used to cover costs related to information security (WS4), design oversight (WS1-4) and the appointment of an independent assessor (WS6). Some day rates were revised to reflect the more senior personnel required for these activities. These changes will be absorbed by projected underspend in the project management activities and are not expected to impact the project's overall cost.
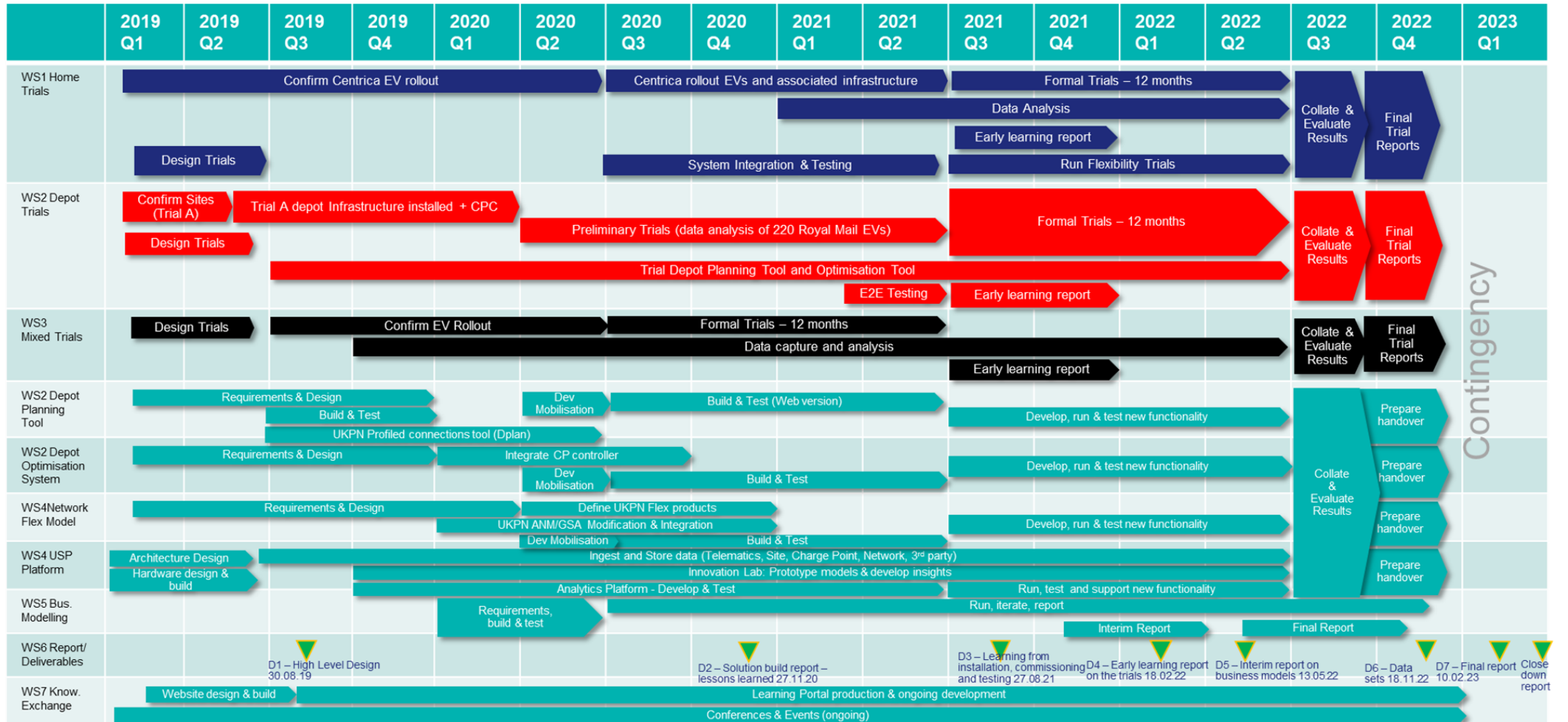- Deliverable D2 was published ahead of schedule on 27 November 2020.

Figure 7 – Summary Project Plan

3.3 Identification and management of issues

In line with the Project Direction, the project must ensure that there is a statistically significant volume of vehicles involved in each trial in order to be confident that the learnings from the trials would be valid when scaled to GB level. To date, Optimise Prime's ability to reach this number has been the key risk faced by the project.

As explained in the previous PPR, a meeting of the project board on 5 June 2020 considered the issues facing project delivery and the recommendations of the Imperial College Consultants report on the sample sizes needed for statistical significance. It was decided to revise the number of EVs in each trial to create greater confidence that the project can be delivered within the agreed timescale, while still achieving statistical significance. It was also decided to include vehicles located outside of the UK Power Networks and SSEN DNO regions where required. These targets are:

Table 2 – Revised minimum EV targets

	WS1 Return-to-home (Centrica)	**WS2 Depot-based (Royal Mail)**	**WS3 Mixed (Uber)**
Recommended minimum sample size	**>300 vehicles***	**100-200 vehicles** (i.e. Phase 1 fleet is sufficient)	**>200 vehicles** for the initial analysis; a larger sample likely to be needed depending on number of trip groups

* Note that 100-200 vehicles would be sufficient for the first stage statistical analysis, but >300 are required for flexibility trials

Optimise Prime is treating these as minimum targets and expects to significantly exceed them in WS1 and 3. In aggregate across the three trials the project still expects to involve 2-3,000 EVs as originally proposed in the FSP.

To date, the project has exceeded the statistical minimum number of vehicles in WS2 and WS3 and WS1 partner Centrica has placed an order which will exceed the minimum required for WS1.

In WS3, despite good progress by project partner Uber in increasing the number of electric PHVs on their platform, the project faced a risk as a result of a decision by TfL in November 2019 to not renew Uber's PHV operator license. On 28 September 2020, Uber's appeal against this decision was upheld and the company was granted a new licence, mitigating the risk faced by the project.

As a result of the above, the issue relating to vehicle acquisition has now been closed. The project continues to closely monitor the acquisition of the remaining vehicles to ensure the trial periods start on time.

Section 0 provides a full list of the risks that are being monitored by the project.

3.4 Look-ahead to next reporting period

The detailed tasks for each workstream for the next reporting period are described in Section 0. In summary, the key tasks for the next period are:

- WS1 – Home Trials
    - Roll out EVs and home charging infrastructure
    - Build, integrate and test of home charging solution
    - Finalise details of flexibility trials
    - Carry out initial experiments
- WS2 – Depot Trials
    - Continue carrying out initial trial experiments
    - Build and integration of the trial applications
    - Complete installation of network monitoring solution at trial sites.
    - End to end testing of applications and systems
    - Design and build of the 'Site Planning Tool'
- WS3 – Mixed Trials
    - Continue to add more EVs to this trial and capture journey data
    - Continue executing mixed trial experiments
- WS4 – IoT Platform, Network Forecasting & Flexibility Analysis
    - Continued maintenance and ongoing development of platform capabilities
    - Maintenance and development of the analytics solution
    - Development of UK Power Networks' ANM system to meet project requirements
    - Development of changes to UK Power Networks' GSA solution
- WS5 – Economic Analysis & Business Models
    - Finalise design of TCO model
    - Begin more detailed business modelling activity based on initial findings
- WS6 – Reporting & Deliverables
    - Prepare June 2021 PPR
    - Begin preparation of Deliverable D3
- WS7 – Project Management & Sharing Learning
    - Continue to monitor project progress and budgets
    - Continue to update the project website
    - Guide detailed design process
    - Support WS1 & WS2 to ensure readiness for the trial period start
    - Continue to participate in industry events.

4 Progress against budget

Details of project progress against budget is given in Confidential Appendix B.

5 Project bank account

A project bank account statement is included in Confidential Appendix C.

6 Project deliverables

Table 3 summarises the current progress towards completing the project deliverables. To date Deliverables D1 and D2 have been published. On 20 February 2020 the project notified Ofgem of a non-material change, delaying the publication of the remaining deliverables by one year. The 'Due Date' column reflects these revised dates. Should it become possible to bring forward the completion of a deliverable the project will endeavour to do so.

Table 3 – Project Deliverables – Showing revised deliverable deadlines communicated to Ofgem as a non-material change on 20 February 2020

Deliverable	Description	Due Date	Status
D1 High level design and specification of the three trials	Report outlining the requirements, use cases, scenarios, technologies and locations for WS1 (Home Charging), WS2 (Depot Charging) and WS3 (Mixed Charging)	30 August 2019	Published
D2 Solution build report – lessons learned	Report setting out the lessons learned from the infrastructure and technology build for the trials. The report will also include a description of the methodology to be used for trials	26 February 2021	Published 27 November 2020
D3 Learning from installation, commissioning and testing	Report setting out the key learning points from the installation, commissioning and testing processes/activities	27 August 2021	Not yet due to start
D4 Early learning report on the trials	Report setting out how each trial is performing, data gathered, insights gained, changes required	18 February 2022	Not yet due to start
D5 Interim report on business models	Interim report outlining the preliminary economic and behavioural findings and high-level options for commercial solutions/business models	13 May 2022	Not yet due to start
D6 Data sets	Final datasets gathered from the trials for dissemination to stakeholders.	18 November 2022	Not yet due to start
D7 Final learning report	A report covering: • A summary of the work undertaken • The insights gained from the trials • Recommendations and likely costs and benefits • Models for use of commercial EV flexibility by DNOs. • Recommendations on business models • How the trials, the infrastructure and technology should be transitioned after the project has completed and How to ensure integration of the Methods with DNO/DSO systems and processes	10 February 2023	Not yet due to start
Comply with knowledge transfer requirements of the Governance Document	1. Annual Project Progress Reports which comply with the requirements of the Governance Document 2. Completed Close Down Report which complies with the requirements of the Governance Document Evidence of attendance and participation in the Annual Conference, as described in the Governance Document	N/A	2019 report published. This report along with the one from June meet the requirement for 2020 Item 2 is not yet due to start

7   Data access details

It is recognised that innovation projects of this nature may produce network and consumption data, and that this data may be useful to others. This data may be shared with interested parties whenever it is practicable and legal to do so and it is in the interest of GB electricity customers. When such data is available the project will provide access to non-personal, non-confidential/non-sensitive data on request, in line with UK Power Networks' Innovation Data Access Policy:
https://innovation.ukpowernetworks.co.uk/wp-content/uploads/2019/11/UKPN-Innovation-Data-Sharing-Policy-7-Nov-19.pdf

As part of deliverable D6, the project plans to make a comprehensive dataset resulting from the trials openly available.

8   Learning outcomes & dissemination

Optimise Prime is committed to sharing learnings with a wide group of stakeholders in order to help accelerate the EV transition. There have been a number of learning outcomes to date, which have been identified throughout the PPRs and in the project's first deliverables.

Optimise Prime continues to maintain the project website www.optimise-prime.com, together with the project LinkedIn account https://www.linkedin.com/company/optimiseprime, providing periodical updates to interested stakeholders.

While the COVID-19 pandemic has limited the project members' ability to attend events in person, a number of presentations have been made to conferences organised online throughout this reporting period. Activities include:
- Article published in Energyst's EV Report 2020 profiling the project
- Centrica and Hitachi Capital Vehicle Solutions promoted the project through their membership in World EV Day, 9 September 2020
- Presentation given by Hitachi at Big Data LDN, 24 September 2020, highlighting the use of analytics in the project
- Project partners presented to The Virtual Fleet & Mobility Live event, 18 November 2020, updating the industry on project progress and initial learnings (Figure 8).

Figure 8 – Question & Answer Session at The Virtual Fleet & Mobility Live

- Presentation given at Cenex-LCV2020, 19 November 2020, updating the industry on project progress, part of a joint session with the Charge NIC project
- Centrica, together with their vehicle supplier Vauxhall, presented at an Accenture webinar on 26 November 2020, sharing learning on the EV transition of their fleet (Figure 9)

Figure 9 – Centrica & Vauxhall webinar agenda

- The project was presented at the CHARGEV/Solar and Storage Live Event on 3 December 2020
- Updated presentations on Optimise Prime were included on UK Power Networks' virtual stand at the Energy Networks Innovation Conference

Where possible, presentations from the above events have been made available on the project website at https://www.optimise-prime.com/presentations.

9 Intellectual Property Rights (IPR)

This section lists any relevant IP that has been generated or registered during the reporting period along with details of who owns the IPR, any royalties that have resulted (Table 4), and any relevant IPR that is forecast to be registered in the next reporting period (Table 5).

Table 4 – IP generated last period (July – December 2020)

IP Description	Owner(s)	Type	Royalties
Deliverable D2, Solution Build Report – Lessons Learned	Hitachi, UK Power Networks, SSEN, Royal Mail, Uber	Relevant foreground IPR	Nil
Profiled Connection Agreements – requirements approach & definitions	Hitachi, UK Power Networks, SSEN, Royal Mail	Relevant foreground IPR	Nil

Table 5 – IP forecast next period (January – June 2021)

IP Description	Owner(s)	Type
Flexibility High Level Design	Hitachi, UK Power Networks, SSEN, Royal Mail	Relevant foreground IPR
TCO Model – High level design	Hitachi, UK Power Networks, Royal Mail	Relevant foreground IPR

10 Risk Management

Table 6 lists the risks highlighted in the FSP as well as new risks that have arisen during the reporting period. This table describes how the project is managing the risks and the potential impact on project delivery.

Since June's PPR the project has identified risks R051 to R055. The project continues to monitor risks and issues through regular risk management meetings. Following each meeting risk impacts and mitigation plans are updated. Three risks have been closed over this period, due to the risk passing. Risks closed in previous reporting periods are omitted.

Table 6 – Project Risk Log

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
			Project Name: Optimise Prime							
R001	Project costs are higher than expected	Project overspend requiring additional Partner contribution or request to Ofgem for additional funding	- Budget completed in 2018 and submitted in the FSP - Budget updated in November 2018 for contracts - Budget is updated each month for actuals and new forecasts, with a new baseline every quarter. - 20/02/20 – Project extended 364 days within current budget, project consortium will explore all available options to mitigate any further extension and the associated impact on budget - 05/06/20 – Risk of further cost overrun reduced by decision to alter EV targets	High	High	Negligible	Open	PM	16/11/2020	
R002	Some aspects of the technical solutions are not achievable to the desired specification within the project budget	The project will not be able investigate all of the available techniques	- 14/06/19 An agile method is planned to be used. The exact method used will be flexed according to budget and time available in order to achieve the project scope.	High	Low	Low	Open	TDA	16/11/2020	
R003	Solution design and implementation is more complex than initially thought	Potential over-spend on solution development	- 14/06/19 An agile method is planned to be used. The exact method used will be flexed according to budget and time available in order to achieve the project scope. - 25/11/19 – New partners may not use CPC, requiring integration with third party systems - 21/10/20 Delays to LPN ANM solution implementation may impact methods. Mitigation by using ANM in SPN area and alternative solution elsewhere. - 16/11/20 Cloud hosted ANM system will be used by UK Power Networks for Optimise Prime	High	Low	High	Open	PM	16/11/2020	
R004	Solution does not deliver anticipated outcomes	Lower than expected value delivered	- Trials design agreed on 07/06/19. - Trial and solution design is clearly defined following set methodology clearly linking activities with outcomes. Designs are agreed with relevant Partners and linked to FSP commitments. - Solution design and business case regularly reviewed throughout the project lifecycle and changes are made where needed - Review of each Deliverable by UK Power Networks prior to submission to Ofgem to ensure the solution delivers the outcomes - 25/11/19 Independent assessor has not raised issues with trials/solution design - 22/05/20 – Imperial College review supports statistical significance of the trial methods to meet learning objectives	Negligible	Low	Negligible	Open	PM	16/11/2020	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R005	Partner performance is not contractually defined	Outputs delayed or inadequate and potential overspends	Weekly meetings with Project Partners, Suitable incentives where required Shared responsibilities for deliverables Contracts signed on 18/03/19 Partner remain committed and performance is tracked by weekly meetings and programme governance	Medium	Low	Medium	Open	PM	16/11/2020	
R006	Suitable equipment suppliers cannot be found	Project will be delayed or require re-scoping	Realistic requirements specified at FSP. Early consultation with suppliers. 10/06/19 Hitachi have selected their suppliers and Royal Mail have selected CP provider and is testing a new telematics system. Changed to Low Risk 22/04/20 – Made negligible as do not see need for more suppliers/equipment at this time	Low	Negligible	High	Open	PM	16/11/2020	
R007	It is not possible to test equipment adequately prior to commencing the trial	Project may need to be re-scoped	Good understanding of supply chain. Realistic requirements specified at FSP. 12/03/20 – Hitachi pilot site installed and ready for testing	High	Low	Medium	Open	PM	16/11/2020	
R009	Partner or supplier may withdraw from project	Partner or supplier needs to be replaced. Partner or supplier withdrawals resulting in new technology or equipment having to be purchased.	14/06/19 Working group established on 03/05/19 to find new participants for the home fleet Weekly status reports with the Partners, and quarterly governance meetings to assess performance. Do not expect any existing partner to withdraw	Medium	Medium	High	Open	PM	16/11/2020	
R010	Suitable sites for trials not available	Demonstrations and trials cannot proceed	10/06/19 – Royal Mail have target list of 21 sites for Trials A and B 05/09/19 – Seven sites agreed for RMG Trial A. 12/03/20 – RMG won't run trial B sites, suitable sites will need to be identified with new trial participants if secured 22/04/20 – Centrica will roll out vehicles throughout GB that may be able to join trials 21/10/20 – Royal Mail trial sites do not include rural depot. Data from rural depots will be analysed as recommended in statistical report. 21/10/20 – Delay to LPN ANM may cause impact on trial start times at some sites. Investigating mitigations.	Medium	Medium	High	Open	PM	16/11/2020	
R012	Changes to key personnel	Project delays due lack of availability of personnel for key roles/loss of knowledge	Ensuring project progress, systems, processes and learnings are well documented in a timely way to prevent loss of knowledge caused by staff changeover.	Low	Low	Medium	Open	PM	16/11/2020	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R013	Specification and build of trials and technology solution takes longer than planned	Project delays	Trials design agreed on 07/06/2019. 27/06/19 – Technical Delivery plan created, close collaboration with Development team in Lisbon set up. 14/10/19 – Planning work completed in September 2019, regularly revise based on progress 12/03/20 – Tech team rolled off. Resumption dependent on fleet progress 22/05/20 – Deliverables delayed to accommodate delayed technology build caused by EV availability 01/09/20 – Applications development re-started and replanned to meet new trial start deadline.	Medium	High	Medium	Open	TDA	16/11/2020	
R016	Major issues with equipment causing damage to network or causes injuries	Equipment is damaged or individual is injured	Analysis of this potential is carried out early in the project and recommendations are incorporated into the design. 22/04/20 – Pilot site in place, insurance in place, no issues to date & minimal risk – change to negligible	High	Negligible	Low	Open	Trial Operatio ns PM	16/11/2020	
R017	Depot Partner may change their plans for the timing of the roll out of EVs and infrastructure	Re-planning and potential for project delays. Potential cost of on boarding new participants. Centrica EV procurement delayed. Royal Mail no longer procuring Trial B vehicles.	Work with Partners in the early stages to ensure plans are realistic and build in contingency. Project will work with Hitachi Capital and new participants to endeavour to meet the volumes. 22/05/20 Discussions with participants has slowed as a result of COVID-19. Deliverables delayed and project evaluating number of EVs needed for statistically significant results. Stage Gate process in place to manage Revised to Low as further change is now less likely.	Medium	Low	High	Open	PM	16/11/2020	
R019	Delays to the procurement and installation of infrastructure	Delays to the start of the trials	Plan procurement and installation as early as possible. Identify alternative suppliers if delays are likely. Monitor supply chain. Early discussion between the Partners and car manufacturers to secure sufficient number of EVs. 22/04/20 – all equipment except load/connection monitoring in place for WS2 Trial A. Commissioning and WS1 progress paused by COVID-19. 22/05/20 – Measures now in place to resume work safely.	Low	Negligible	High	Open	PM	16/11/2020	
R020	EV Subsidies are curtailed earlier than forecast	EV rollout slows and business case affected. BEV congestion charge discount ends December 2025	Closely monitor legislative proposals with OLEV. Lobby where necessary. 12/03/20 – discussion held with TfL re. congestion charge impacts 22/05/20 – TCO model being updated to reflect current subsidy environment	High	High	Low	Open	PM	16/11/2020	
R022	Legislative changes	Legislative changes mandate project methods or make them illegal by mandating alternative methods. Project business case is not achievable	Closely monitor legislative proposals with OLEV. Lobby where necessary.	High	Low	Low	Open	PM	16/11/2020	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R024	Ofgem ability to Halt the Project (Cancellation)	Ofgem may halt the project in certain circumstances e.g. because it has become clear that the Method is not viable or there are other reasons why it is not efficient, or not possible to continue with the project. Ofgem will identify Halted Project Revenues; funds received by Funding Licensee which have not yet been spent (less funds to halt the project).	Critical to keep accurate and up to date records of expenditure and evidence of committed funds. Project is continuously reviewing circumstances, assessing risks and impact, preparing different options and involving Project Board in decision making. Ofgem is notified of changes and consulted where necessary	High	Low	Negligible	Open	PM	16/11/2020	
R029	WS1 – EV targets are not met	Potential that WS1 is unable to meet EV targets due to factors outside Project control, EU CAFE regulations place obligations on vehicle OEMs that may encourage them to delay new ultra-low carbon LCV launches into 2020 Centrica original EV purchasing timeline delayed,	Project will work with Hitachi Capital and new participants to endeavour to meet the volumes. Stage Gate process in place to manage project spend if EV volumes are ahead of, at or behind target 30/04/19 Fortnightly meetings taking place 14/06/19 – Draft Strategy produced and a list of target potential participants being pursued. 29/11/19 – Targeted spend option chosen to give time for vehicle procurement 22/05/20 – Considering Centrica fleet cars, out of area EV vans to supplement trial as a mitigation; Exploring number of vehicles required for statistically significant result 17/07/20 – Centrica have announced order for 1,000 vehicles and should now meet project requirements. Probability changed to Low. 16/11/20 – Centrica have confirmed plans for 2020 and committed to regular rollout progress reports	High	Low	High	Open	PM	16/11/2020	
R030	WS3 – EV targets are not met	Potential that WS2 is unable to meet EV targets due to factors outside Project control, e.g.: Vehicle availability, TCO Issues, individual drivers' choice -Uber issued 2-month licence extension by TfL 24/09/2019 -TfL revoked Uber's Licence 25/11/2019	Uber vehicle growth on target 25/11/19 – Uber are appealing decision of TfL not to grant license in London. Continuing to operate until appeal decided – See R047 22/04/20 – Number of EVs on road has declined due to COVID-19 lockdown. In other geographies journey numbers have quickly recovered – continuously monitoring number of EVs on road 29/09/20 – Uber to be granted new license. EVs on road exceed 1,000. Risk downgraded to negligible.	High	Negligible	High	Open	PM	16/11/2020	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R031	WS2 – EV target not met	Potential that WS2 is unable to meet EV targets due to factors outside Project control, e.g.: Vehicle availability, TCO Issues, change in corporate strategy 12/03/20- RMG no longer expect more vehicles in FY2020/1	Work with Partners in the early stages to ensure plans are realistic and build in contingency. Project will work with Hitachi Capital and new participants to endeavour to meet the volumes. Stage Gate process in place. New trial participant on-boarding work begun 29/11/19 – Targeted spend option chosen to give time for vehicle procurement 22/04/20 – all 220 Trial A vehicles on road 22/05/20 – Exploring number of vehicles required for statistically significant results 11/06/20 – Revised EV targets will reduce risk as current volume exceeds statistical minimum. Probability changed to Low. 16/09/20 – Royal Mail may add small number of EVs at existing sites during next year	High	Low	High	Open	PM	16/11/2020	
R036	Ability to measure depot load at Royal Mail sites	Not yet clear how project will measure the site load at Royal Mail depots.	10/07/19 Several options – feasibility being explored. Site dependent 14/10/19 – Candidate solution being investigated. 12/03/20 – Load monitoring ordered and site surveys done. Awaiting install 13/10/20 – All sites except Mount Pleasant online. Chasing Centrica to resolve 21/10/20 – UK Power Networks to confirm site surveys to roll out LV monitoring equipment	Low	Low	Low	Open	Trial Operations PM	16/11/2020	
R038	Acceptance test site and depot sites will not be exactly the same	Likely differences in network, exact CP, scale and ability to test user interfaces effectively.	05/09/19 CPs and back office will be identical, EVs will not, so some tests may need to happen of RMG site with RMG van prior to live use. 12/03/20 – Strategy to test at test site then at one depot before wider rollout	Low	Low	Low	Open	Trial Operations PM	16/11/2020	
R040	Unable to meet the evidence criteria for Ofgem Deliverables D2 & D3 in current timeframe	The evidence for D3 "Report setting out the key learning points from the installation, commissioning and testing processes/activities" is due on 28/08/2020. Trial Period delayed to 01/10/20 creating risk that all learnings may not be captured to meet the evidence criteria by this time. Same issue with D2.	11/09/19 – Work with Partners to make them aware of the requirements for D3. Ensure the progress of each trial is monitored and all key learnings are captured as activities are progressing. D3 can be delayed by up to one year without being a material change. 14/10/19 – Likely that D2-7 will be delayed while EV numbers are confirmed 29/11/19 – Delay agreed at board meeting, re-planning to take place 20/02/20 – Ofgem informed of change, will continue to monitor in case of further challenges 21/10/20 – Potential for ANM system delay in LPN to risk not completing before D3 due 16/11/20 – UK Power Networks exploring use of cloud hosted ANM system	Low	Medium	Medium	Open	PM	16/11/2020	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R041	Lack of coordination for integrating UK Power Networks systems with Hitachi IoT platform and home aggregation platform	There is currently no dependency built in to the programme plan with regards to integration of the different systems/platforms that are being developed by the Partners. There is a risk that if a development of a particular system/platform is delayed it could potentially have an impact on the start of the trial.	11/09/19 – Work with Partners to build the key dependencies into the overall programme plan and track progress 23/09/19 – Identifying resource requirements for integration and testing of project systems and infrastructures. 14/10/19 Dialogue ongoing between Hitachi, UK Power Networks and Centrica. 12/02/20 – Draft plan completed for discussion – UK Power Networks planning ANM developments 22/04/20 – Further flex meetings with Centrica. R32 merged to remove duplication. 22/05/20 ANM systems vendor carrying out work to capture detailed requirements for integration of the partner systems 16/09/20 – First draft of flex design is written and being reviewed. 21/10/20 – UK Power Networks to provide API specifications	Medium	Medium	Medium	Open	PM	16/11/2020	
R042	Trialling of profiled connections in network congested areas posing network security risk	Trialling profiled connections for a site connected to a congested area of the network could pose a network security risk due to breach of the agreed profile.	11/09/19 – Carry out trials of profiled connections in a safe environment, i.e. at sites that are within their agreed capacity, setting the agreed profile lower to ensure a breach does not lead to network security risk and ensure a simulation exercise is carried out to assess the risk.	Low	Low	Medium	Open	UK Power Networks PM	16/11/2020	
R044	DPlan rollout delay to EPN/SPN	Profiled connection assessments using existing planning tool cannot be carried out for Depot sites in EPN/SPN area as DPlan is not yet rolled out. There is a risk that additional cost and time will be required to build the network in these areas using DPlan.	Limit the Royal Mail profiled connection trial sites to LPN. Investigate the cost/time of developing SPN sites in DPlan on an ad hoc basis. (16/09/19). Escalated to Head of Innovation 12/03/20 – SPN DPlan part of UK Power Networks BAU activity, low dependency for project trials. 16/11/20 – Confirmed that all sites will be within their connection agreements, and profiled connections will be a simulated one within the existing connection, so detailed assessments are not required.	Medium	Low	Medium	Closed	UK Power Networks PM	21/10/2020	16/11/2020

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R045	EV Volume Risk to project	The existing Partners are unlikely to provide the volume of vehicles required for WS1 and 2 in the original project timeline. Potential impact to validity of learnings.	Working group has active conversations with new participants with at home and at depot vehicles. Considering extending project pending vehicle availability Slowing development work in order to allow extended or paused programme. 22/04/20 – Participant talks in progress but disrupted by COVID-19 issues. Considering additional out of area EVs as well as well as the number of vehicles required for statistically significant results 05/06/20 – Project board decision to re-size trial samples alleviates this risk. 09/06/20 – Ofgem meeting held where Ofgem were positive towards resizing trials as long as deliverables were not affected. 17/07/20 – Centrica have placed order for 1,000 vehicles. Probability changed to Low 13/10/20 – Uber licence renewed, all trials are committed to exceed minimum vehicle numbers.	High	Low	High	Open	PM	16/11/2020	
R047	Uber licensing decision	TfL has announced that it will not renew the PHV Operator licence of Project Partner Uber	Uber is working closely with TfL, is appealing the decision, and will continue to operate in London during the appeal process A significant amount of data has been, and continues to be, collected from Uber EVs. New trial participant process will be extended to WS3 if Uber loses ability to operate in London 28/09/20 Uber licence renewed – risk closed	Medium	Medium	Medium	Closed	PM	28/09/2020	28/09/2020
R049	Potential changes to partner back office systems	Level of M&A activity in the segment may result in changes to CPO back office suppliers requiring more integration work	Talking to a number of CPOs as part of new participant discussions. 23/06/20 – Discussing potential to test control via back office with CPO providers as alternative method 16/11/20 – Awaiting costs and timeframes	Low	Low	Low	Open	Design Auth.	16/11/2020	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R050	Coronavirus/COVID-19	Spread of Coronavirus may result in business disruption to project partners and/or supply chain issues. Potential delays to project from significant time off work for project members. Further delay to EV delivery and participant discussions will impact development ramp-up, Trial Period and deliverables.	Partner companies and employees to take reasonable precautions including ability to work from home as required. Partners were asked at the board meeting on 03/03/20 to report if any issues were identified that could impact the project. No direct impacts were identified at that point 16/03/20 – Uber raised risk of lower demand slowing change to EV in immediate term. Some vehicle manufacturers, e.g. Peugeot have suspended production which may have knock on effects on EV delivery. Social distancing may disrupt partner or other discussions. 07/04/20 – Site works suspended. Centrica warn that lead time on vehicles likely to extended and other works delayed. 22/05/20 – Centrica EV order delayed and new participant discussions paused. Project has informed Ofgem of issues and is exploring options such as investigating the number of EVs needed for statistical significance to ensure the project delivers expected learnings 11/06/20 – Board decision to re-size trials mitigates some risks regarding finding partners, changed probability to low 13/10/20 – Risk remains but is low as all partners have or are committed to have vehicles. 16/11/20 – Second lockdown started – no major impact yet, continuing to monitor	High	Low	High	Open	PM	16/11/2020	
R051	Partner major restructuring (1)	Project partner has announced major restructuring. Risk of impact on project progress or changes in staffing	17/06/20 – Monitoring situation, not believed to impact EV rollout 21/10/20 – The process is complete and has not impacted project – Closed	Low	Negligible	Medium	Closed	PM	21/10/2020	21/10/2020
R052	Partner major restructuring (2)	Project partner has announced major restructuring. Risk of impact on project progress or changes in staffing	30/06/20 – Monitoring situation. Majority of partner's infrastructure is complete, so risk is low.	Low	Low	Low	Open	PM	16/11/2020	
R053	Limited control of legacy CPs at depot sites	Testing at FAT site has identified that iHost/CPC is not effectively controlling Swarco CPs. If not fixed this will limit project's ability to control some vehicles at RMG sites.	30/06/20 – Nortech have raised the issue with Swarco. Swarco are revising the firmware of the units in order to allow full control of the CPs by iHost/CPC 21/10/20 – Site visit with Swarco has identified issue and upgrade is being rolled out to all CPs. Awaiting testing. 16/11/20 – Fix has been tested at Trowbridge and appears to have resolved issue. Monitoring.	Negligible	Medium	Low	Open	PM	16/11/2020	
R054	Reliance on third party systems - CSMS	The project relies on a secure connection with Royal Mail's CSMS to control RMG chargers. The project has no direct contractual relationship/SLA with the CSMS. Due to a VPN configuration change comms were disrupted.	17/08/2020 – Continuing to press CSMS to resolve the issue via Royal Mail and Nortech. Issue caused by their third party IT service provider. 16/09/2020 – Static IPs have been established to resolve this issue and prevent reoccurrence. 16/11/20 – No further outages experienced.	Negligible	Low	Low	Open	PM	16/11/2020	

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R055	LV monitoring of Royal Mail sites on the network side of the POC.	Profiled connection requires the network side of the POC to be monitored to ensure adherence of the customer's site to the agreed profile. For customers who are not connected via dedicated feeders or substations, an alternative monitoring solution needs to be installed at the metering point on customer's site and will require integration to UK Power Networks' ANM system to transfer the real-time analogue measurements. This integration development work will require additional time & effort and there is risk that pre-trial activities may be delayed as a result.	06/11/20 – Have identified a UK Power Networks approved LV monitoring solution that could potentially be utilised for this application. Continue to engage internally within UK Power Networks as well as with the supplier to confirm suitability of using the LV monitoring solution. Once confirmed engage with LV monitoring equipment and ANM system suppliers to develop a plan to deliver the integration development work.	Low	Medium	Medium	Open	UK Power Networks PM	16/11/2020	

11 Material change information

No material changes have been encountered during this reporting period and none are foreseen for the next reporting period.

12 Other

There is no other information to report to Ofgem.

13 Accuracy assurance statement

The project has implemented a project governance structure as outlined in UK Power Networks' innovation policies and procedures. All information produced and held by the project is reviewed and updated when required to ensure quality and accuracy. This report has gone through an internal project review (and a further review within UK Power Networks) to ensure the accuracy of information.

UK Power Networks hereby confirm that this report represents a true, complete and accurate statement on the progress of the Optimise Prime project in its first twelve-month reporting period and an accurate view of UK Power Networks' understanding of the activities for the next reporting period.

Signed ....

Name .... S. ALLI ....

Position ...... DIRECTOR OF CUSTOMER SERVICES, STRATEGY, REGULATION & IS

Date .... 11th December 2020 ....