## NIC Project UKPNEN03

# Project Progress Report

## June 2021

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) |
| OTA | Over-the-Air |
| OZEV | Office for Zero 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 |
| SGS | Smarter Grid Solutions |
| 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 |
| 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, SSEN, 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 fourth Project Progress Report (PPR) for the Optimise Prime Network Innovation Competition (NIC) project, covering the six-month period between 19 December 2020 and 18 June 2021. This document, together with the next six-monthly report, due to be published in December 2021, will fulfil the reporting requirements of Sections 8.11 – 8.15 of v3.0 of the NIC Governance Document for 2021. 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 good progress towards delivering the three trials throughout the last six months. The WS3 trial is in progress, while the WS1 and WS2 trials are on track to begin on 1 July 2021. Since the last report, despite the ongoing challenges posed by the COVID-19 pandemic, the project has completed the installation of infrastructure at depots and continued to develop and test the trial systems and processes.

Over this period, the project has successfully:

- Completed the installation and commissioning of all devices at depots, developed the depot control and optimisation software and the site planning tool application.
- Met the minimum required number of vehicles in all trials
- Collected data and carried out initial trial experiments in WS1, 2 and 3
- Further developed the flexibility systems and processes for WS1 and 2
- Developed models based on PHV demand, focusing on the combination of on-shift and off-shift charging events as part of the WS3 trial
- Started behavioural modelling activity through a series of questionnaires
- Managed the programme, its risks and finances.

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 Vivaro-e vans in July 2020. While the rollout of vehicles has taken longer than anticipated, the company is now making good progress at rolling out vehicles and installing the required charging infrastructure at drivers' homes. The minimum target of 300 vehicles has been reached, with the full order of 1,000 expected on the road by September 2021. Centrica is sharing charger and telematics data regularly with Hitachi, based on which initial trial activity has begun.

Work on integrating the charge points, the flexibility platform and UK Power Networks' Active Network Management (ANM) system is ongoing. The delivery of some elements of this technical solution has been delayed, however flexibility trials are expected to begin on schedule and an interim manual solution is being considered for the closer to real time flexibility products.

In WS2 (Depot Trials), 226 EVs are now operating from seven Royal Mail sites. Hitachi has worked closely with Royal Mail to commission the end-to end control of depot charge points from the project's systems. A further two depots are being added to the trials shortly using an alternative 'over-the-air' (OTA) control system, adding twelve more vehicles to 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.

The web based ‘site planning tool’ has been developed and is undergoing testing. This tool allows a user to estimate a load profile resulting from electrification that can be used in applying for a profiled connection or specifying smart charging.

UK Power Networks have further detailed the three flexibility products that will be used in WS1 and WS2 trials to test the flexibility response of EV commercial fleets and, together with SSEN, have planned the approach to testing flexibility. As noted above, work to adapt UK Power Networks’ ANM System to support the flexibility trials has experienced some delays and manual processes may be used to mitigate this where necessary.

In WS3 (Mixed Trials), Uber has continued to collect and anonymise trip data from EVs on their platform, while UK Power Networks and SSEN have been collating utilisation data of their secondary substations throughout Greater London. The WS3 trial period is ongoing and Hitachi data scientists have continued to develop models to estimate charging demand and its potential impact on the distribution networks.

At the time of writing, the Optimise Prime partners have over 2,600 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 supporting the application development and analysis work required for the WS1, 2 and 3 trials. This work has progressed well and once the trials begin this workstream will transition to an ongoing support role.

UK Power Networks have continued to work with Smarter Grid Solutions (SGS) to develop the ANM functionalities required for Optimise Prime trials WS1 and WS2. While some delays have occurred in this activity, work is well underway and expected to be complete in the next quarter. The main reason for the delay is the additional development time required to accommodate the functional requirements for the two closer to real-time flexibility products.

### 1.3.3 WS5 – Economic Analysis & Business Models

The Economic Analysis & Business Models workstream has baselined the High-Level Total Cost of Ownership (TCO) model and begun a series of surveys of partner drivers and managers to gather information on behavioural factors impacting on the EV transition.

### 1.3.4 WS6 – Reporting & Deliverables

This Project Progress Report was produced, and work has begun on producing Deliverable 3.

### 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.

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, the programme has continued with a programme of knowledge exchange activities, as detailed in section 8.

## 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.

The project has successfully mitigated the major issue regarding vehicle availability and as a result 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 potential impact of delays in completing the development of flexibility systems on the completion of the trials
- The requirement to manage project budgets carefully in order to deliver the extended project within the original budget.

## 1.5 Project Learnings

The testing and commissioning work that has taken place in WS2 has created a number of learnings regarding the impact of technical and behavioural factors on the design and implementation of smart charging regimes. These are summarised in this report and will be explored in more detail in Deliverable D3.

In WS2, Optimise Prime has assessed the Royal Mail fleet operational schedules which will allow the project 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. The project team has once again needed to update systems following an un-announced system change by a telematics provider, this has highlighted the need for ongoing development support and the inherent risk of relying on external data providers.

The WS1 and 2 pre-trial activities have allowed the project to develop predicted models of EV behaviour based on ICEV data against which behaviour of the EVs in the trials can be compared.

The WS3 trials have started to produce a number of learnings, including highlighting geographical areas of London and times where demand for charging is concentrated and locations where drivers are having to travel significant distances to charge due to current lack of charging facilities. Network data has been compared with charging events to identify substations which lack capacity to accommodate EV growth. Initial learnings from the three trials will be published in Deliverable D4.

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 partner 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 and the start of the WS1 and 2 trials in July 2021. In summary, key achievements include:

- WS3 trials are in progress and WS1 and 2 have met the revised EV targets ready for start of formal trials in July
- The execution of experiments has commenced in each of the three trial workstreams.
- In WS2, behind-the-meter load monitoring systems have been installed at all depots and testing and commissioning of end-to-end charging control
- The approach to delivering and testing flexibility services within the trials has been further detailed and work on developing changes to UK Power Networks' ANM system, and Hitachi and Centrica's flexibility service provider platforms is underway
- The development of the depot management applications has made good progress and is on track to be able to manage depot charging load from the start of the WS2 trials
- The Site Planning Tool web app has been developed and is being tested by project partners
- The business model workstream has baselined the total cost of ownership model and embarked on a series of surveys of drivers and fleet managers
- The project partners have continued to promote the project through publications and events.

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 a meeting was held on 5 March 2021.

In addition, a regular 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

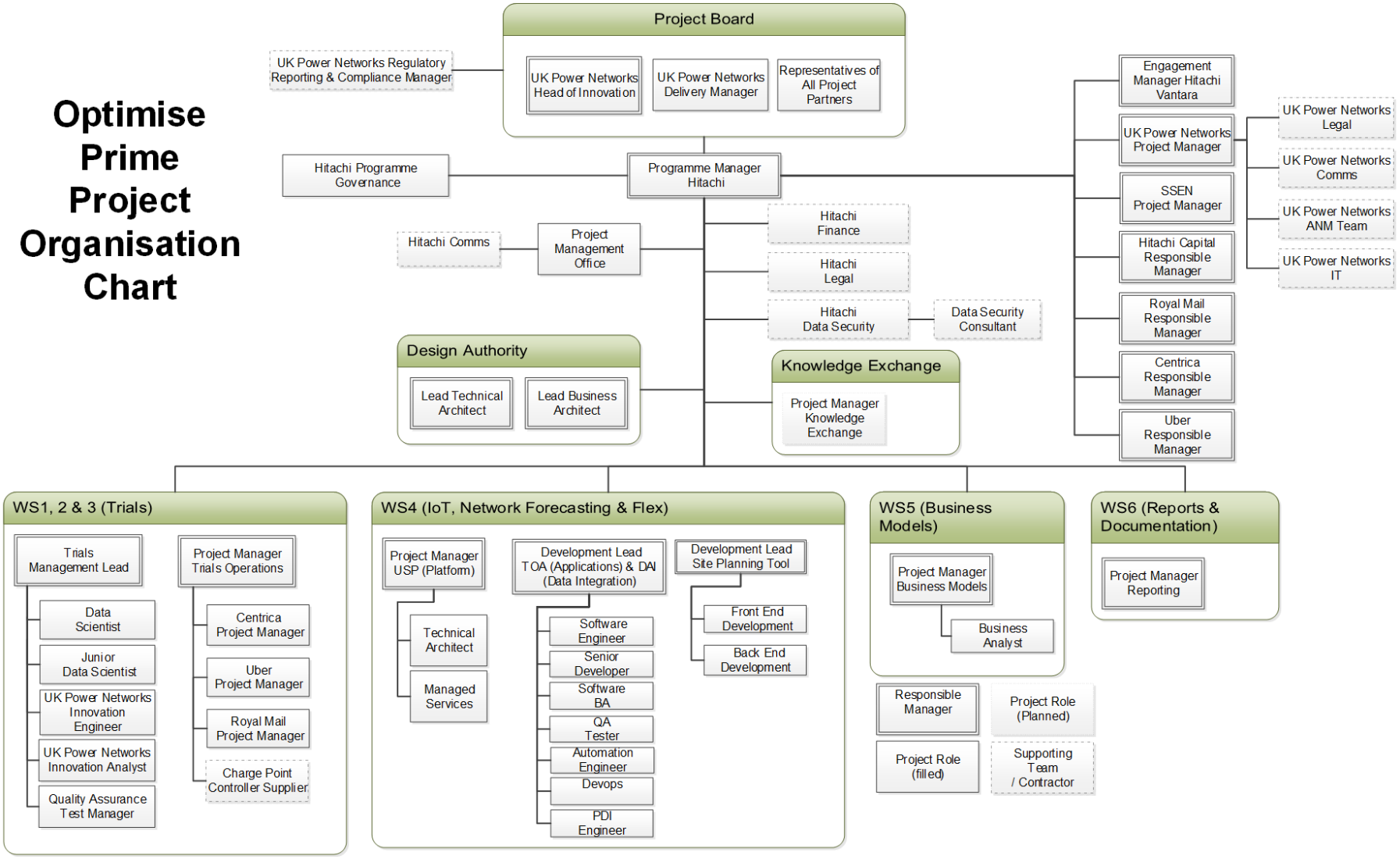


**Figure 1 – Optimise Prime Organisation Chart**

### 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 continued to deliver the depot management applications and additional team members have joined to deliver the Site Planning Tool. An additional business analyst has joined the Business Models team. There have been some changes to project personnel at Hitachi and Centrica, the handovers between staff have been managed to mitigate against impact to the project.

## *2.2 Workstream progress*

### 2.2.1 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.

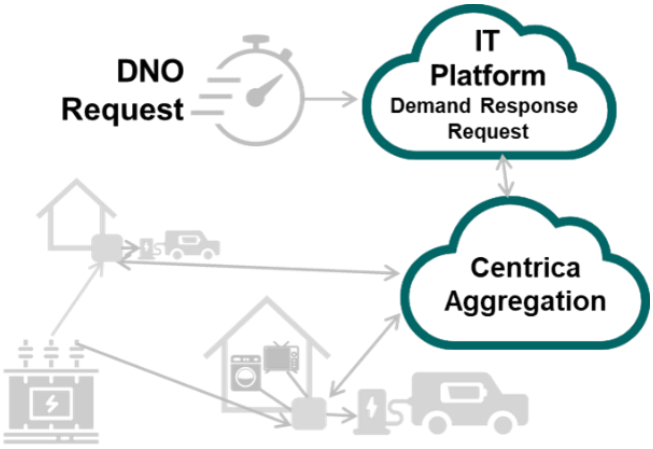


**Figure 2 – Schematic of WS1 trial**

#### *2.2.1.1 Progress in this reporting period*

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

- **EVs** – Continued to roll out an order for 1,000 Vauxhall e-Vivaros to be used by British Gas throughout the UK. At the time of writing the minimum volume of 300 has been reached, with the remaining vehicles due for delivery over by the end of September.
- **CPs** – Continued the installation of EV charging infrastructure at drivers' homes, installing devices at over 390 locations
- **Technology** – Continued to operate a driver app as part of the CP control solution, and to capture data from CPs and vehicle telematics.
- **Flexibility** – Contributed to the detailed design of the flexibility products and planning of the flexibility experiments, together with UK Power Networks, SSEN and Hitachi
- Detailed design of the solutions for the control of charging in response to flexibility requests, managing bids and response, and for reimbursement of charging costs to drivers
- **Data** – Began providing data from charging and telematics data to Hitachi for analysis purposes.

UK Power Networks has:

- Together with Centrica and Hitachi, developed the specification of the flexibility products and the detailed design of the flexibility trials (including consideration of pricing, timing and frequency)
- Developed internal end-to-end processes for each of the three flexibility products to be trialled
- Worked with SGS to continue developing the ANM functionalities required for the flexibility trials including baselining the API specification and producing a test strategy and plan.
- Built the Flexibility Settlement Tool, which will be used to calculate payments for each flexibility event based on Centrica's performance
- Identified the Strategic Forecasting System, under development, as the most relevant tool to take inputs from Hitachi's analysis and model wider network impact of fleet electrification.

Hitachi has:

- Carried out a number or pre-trial experiments on data from Centrica's existing ICEV fleet in order to estimate the potential load from British Gas EVs in unmanaged and smart charging scenarios. These have included experiments to:
    - Analyse the location of drivers in the data set and assign them profiles to identify urban, rural and suburban drivers
    - Based on telematics analysis, visualise the schedules of drivers and group them based on schedules and distance travelled
    - Estimate expected magnitude and timing of load on the electricity distribution network resulting from home charging when the existing ICEV fleet is converted to electric
- Planned the experiments for the trial period
- Created the framework for data science analysis and developed models to approximate future unmanaged charging demand based on historic data
- Designed and implemented a series of questionnaires for Centrica drivers and managers to gather behavioural information regarding the EV transition as part of WS5.
- Worked with UK Power Networks, SSEN and Centrica to design the flexibility products and trials in detail.

SSEN has defined a series of flexibility trials that will be manually implemented with British Gas vehicles in the SSEN DNO region.

### *2.2.1.2 Challenges and lessons learnt*

The key challenges faced in this workstream have been related to the delays in delivery of vehicles and in the completion of the flexibility systems, caused as a consequence of delays to UK Power Networks' ANM system development, and availability of suitable resources within the project partners.

The minimum number of vehicles has now been achieved ahead of trial start and the full order is currently expected to be in use in September 2021.

Flexibility experiments have been scheduled so they take account of the forecast availability of the required systems.

### *2.2.1.3 Outlook for the next reporting period*

During the next reporting period, WS1 will focus on:

- Start of the trial period on 1 July 2021
- Continue capturing and analysing data from charge points and telematics
- Complete the rollout of all EVs and charge points
- Complete the development and testing of flexibility systems and begin flexibility trials.

## 2.2.2 WS2 – Depot trial

The depot trial, shown in
Figure **3**, 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 continuation of pre-trial experiments.

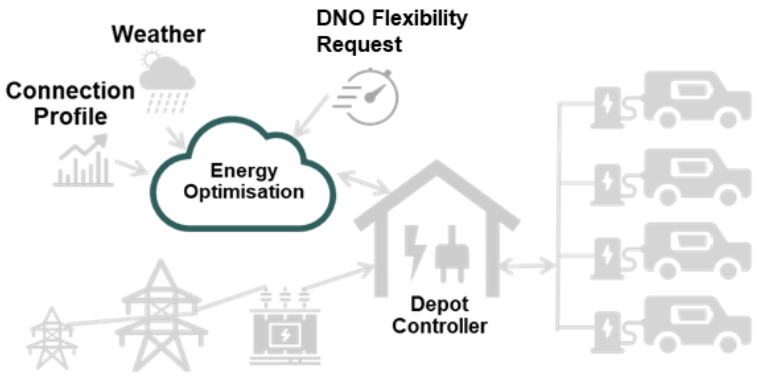


**Figure 3 – Schematic of WS2 trial**

### *2.2.2.1 Progress in this reporting period*

In the depot trial, Royal Mail has:

- Continued to operate their fleet of EVs (Figure 4)
- Installed behind the meter load monitoring at three further depots, Mount Pleasant, Camden and Victoria, completing the rollout of these devices
- Supported Hitachi in commissioning and testing the CP control system
- Contributed to the analysis of the pre-trial experiments
- Organised staff participation in behavioural analysis surveys
- Together with Hitachi and UK Power Networks, contributed to the further development of plans for flexibility and profiled connection trials.


**Figure 4 – Royal Mail EVs charging at Dartford Delivery Office (left) and Mount Pleasant Mail Centre (right)**

Hitachi has progressed the following activities:

- **Depot control** – Testing and commissioning of end-to-end control of charging at Royal Mail depots from the Hitachi platform developed in WS4
- **Depot optimisation** – Designing and developing the system for planning and managing the charging of vehicles within a depot. The system dynamically monitors the available headroom based on site load monitoring, connection limits and flexibility events. It then prioritises charging of vehicles based on their state of charge and future schedule. This core functionalities of this system are planned to be complete in time for trials start on 1 July 2021
- **Depot flexibility** – Designing and implementing the flexibility service provider part of the depot application and the interface with UK Power Networks' ANM system. Development and testing work is ongoing and will be completed in line with UK Power Networks' ANM functionality
- **'Over-the-air' (OTA) charge point control** – In order to add two further depots to the project (and additional CPs at one site where it was not possible to connect using ethernet) it has been decided to develop a modification to the original method in order to trial the control of chargers through the charge point management system, rather than on-site Charge Point Controller (CPC) hardware. Development and testing of this functionality is underway
- **Site Planning Tool** – Development of a simplified web-based version of the depot planning model that can be used by fleet managers to size their depot requirements. The development of the first version of the tool is complete and undergoing testing by project stakeholders to gather feedback (Figure 5)

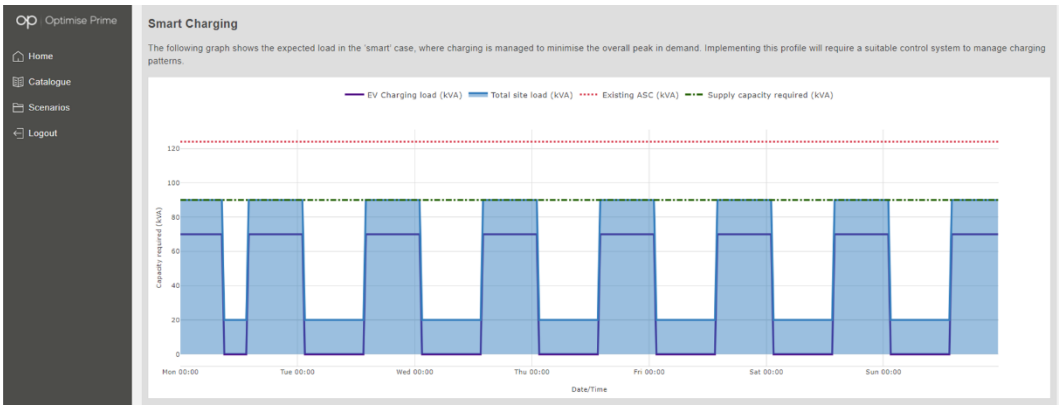


**Figure 5 – Example output of Site Planning Tool**

- **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
    - Experiment 4 – Predicting depot load profiles based on the degree of electrification of the fleet and the charging mode adopted
    - Experiment 5 – Production of indicative load patterns for a depot, comparing seasons and optimisation strategy
    - Experiment 6 – Analysis of the network cost impacts of increased electrification of additional Royal Mail depots
    - Experiment 7 and 8 – Initial activity has been completed to define the scope of required LV and HV network modelling
    - Experiment 10 – Use the depot planning model to demonstrate ability to shift EV load to meet profiled connection requirements
    - Experiment 16 – Predict the availability of flexibility services from depot based EVs

  Other experiments, which relate to profiled connections, flexibility or modelling and extrapolation of results, will be run once the trial period is underway
- **Modelling** – Improved understanding of the operation of the Royal Mail depots has enabled the creation of a baseline to compare charging events against and has enabled the development of smart charging and cost minimisation logic. Models have also been developed as part of the experiments to predict load, given variables such as optimisation schedule or season, and to develop a baseline flexibility model to aid in planning bids.
- **Trial planning** – Planning of the experiment execution schedule for the trial period.

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

- **Profiled connections** – Planned and commenced the rollout of the network monitoring solutions required for the profiled connection offering – completion of rollout is expected before the start of trials.
- **Network impact modelling** – started to define the method for modelling the impact of electrification on the network and identified the Strategic Forecasting System, under development, as the most relevant tool for carrying out wider network impact analysis of fleet electrification.
- **Flexibility design** –
    - Further detailed the design of the three flexibility products that will be tested, in order to define the operation of the flexibility trials
    - Developed internal end-to-end processes for each of the three flexibility products to be trialled
- **Flexibility implementation** –
    - Together with Hitachi, Royal Mail, Centrica and SSEN, created plans for the development, testing and trialling of flexibility functions
    - Together with SGS, continued the development of ANM functionalities required to implement profiled connections and flexibility
    - Built the Flexibility Settlement Tool, which will be used to calculate payments for each flexibility event based on Centrica's performance

### *2.2.2.2 Challenges and lessons learnt*

A number of challenges were faced in enabling the commissioning and testing of the systems at Royal Mail depots. In addition to the specific issues mentioned below, COVID-19 restrictions have continued to limit the project's ability to progress site-based work, though this has not impacted on the completion of works in time for the trial period.

**Control of CPs**
Testing of the depot systems has continued to expose variations in how charge points operate, both due to the designs of different suppliers and differing firmware versions/settings throughout Royal Mail's estate. This potentially has an impact on the ability of the solutions to accurately implement smart charging regimes. These issues have been rectified or are being mitigated through work with the charge point/controller suppliers and testing at the project's acceptance site. Issues have included:

- Default frequency and method of set point/power use reporting
- Behaviour when sent zero/low set points
- Behaviour when EVs are unplugged, CPs reset or on other changes of state
- Ability of CPs to process frequent set point requests, or simultaneous requests to multiple sockets
- Time synchronisation between charge points and other systems.

**Impact of local driver behaviour and depot routines**
The Royal Mail depots in the project have developed different practices with regard to charging of their EVs, partly as a result of differing ratios of vehicles to charge points, as well as daily delivery/collection distances travelled for each vehicle. These practices can impact upon the accurate estimation of charging demand. Impacts can include:

- Frequency of plugging in EVs and authenticating charge point (every shift, vs. as needed)
- Identification of EVs – the AC charging system does not identify specific vehicles, so identification relies on RFID tags being associated with specific vehicles and used to authenticate charging sessions
- Vehicles not involved in the trial may plug into chargers or block access to chargers.

The project will evaluate the extent to which policy and technical solutions can overcome these problems.

**Site Planning Tool simplification**
In the development of the site planning tool a significant amount of thought has been put into how the design of the original model, developed for the project's internal use, can be transitioned into a public-facing tool. Reviews were carried out with Hitachi, UK Power Networks and Royal Mail to gain inputs into the design and these organisations are also taking part in user acceptance testing.

**Network monitoring solution at Royal Mail depots**
The initial site survey at a Royal Mail depot has identified complexities in installing the LV monitoring equipment at the cut-out (metering point) location of the site. This has led to investigating alternative arrangements to gain voltage measurements and an additional site visit was required to determine the optimum arrangement. Learnings from the challenges have included the addition of specific instructions and guidelines to existing Standards documents and setting up a training session to familiarise the field staff with the new LV monitoring equipment as well as installation requirements at a customer premises.

### *2.2.2.3 Outlook for the next reporting period*

During the next reporting period, the WS2 will focus on:

- Start of the trial period on 1 July 2021
- Continue capturing and analysing data from charge points and telematics
- Completion of testing to enable control of vehicles at additional depots over-the-air
- Completing development and testing of changes to UK Power Networks' systems to accommodate flexibility services from EVs

- Analysing data and development of data science models in support of the trials experiments.

## 2.2.3 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. This trial commenced in August 2020.

### *2.2.3.1 Progress in this reporting period*

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. Anonymised trip data is now being captured from over 1,500 Uber EVs
- **Experiments** – Provided feedback on the results of data analysis based upon knowledge of Uber vehicle operations
- **Behavioural analysis** – Took part in driver and manager surveys to capture attitudes to the EV transition.

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 launched 'Uber Green' in London, enabling customers to specifically request a zero-emissions vehicle.

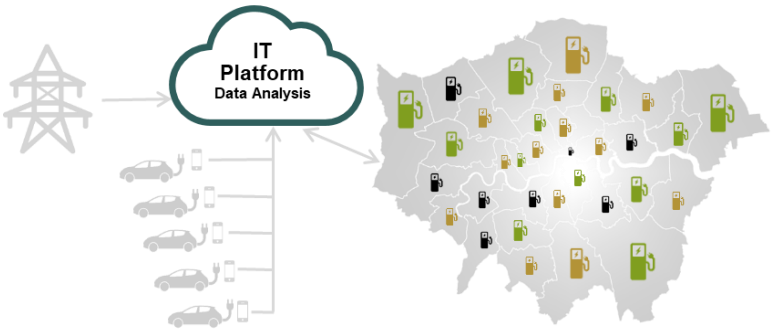


**Figure 6 – Schematic of WS3 trial**

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, filtered to remove dedicated substations that could not be used to support EV charging.
- **Experiments** – Reviewed and provided comment on the outcomes of the analysis and trial executions
- **Network modelling** – Identified the Strategic Forecasting System, under development, as the most relevant tool to take inputs from Hitachi's analysis and model wider network impact of PHV electrification

Hitachi has progressed the following activities:

- **Data** – Continued to capture, validate and store the data from Uber, UK Power Networks, SSEN and CP location database Zap-Map.
- **Experiments** –
    - Developed methodologies to derive estimated charging patterns from Uber's journey data, focusing on merging the analysis of 'on shift' and 'off shift' charging patterns

- 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
- Continued to carry out a number of experiment executions, based on updated data, including executions of the following trial experiments:
  - 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.

#### *2.2.3.2 Challenges & lessons learnt*

Workstream 3's data capture has largely proceeded to plan, with data being captured successfully throughout the trial period and data analysis ongoing.

The lockdowns as a result of COVID-19 have resulted in changes in demand patterns for PHVs. This has particularly impacted certain journey types such as trips to airports. While the project has seen a reduced number of trips, there has consistently been over 1,000 electric PHVs active each week during the trial period. Where possible the impact of COVID-19 will be established through comparison of data from before, during and after the lockdown periods.

#### *2.2.3.3 Outlook for the next reporting period*

During the next reporting period, the WS3 will focus on:

- Continuing the capture journey data
- Re-running and refining analysis as more data becomes available
- Visualising results for use in deliverables and knowledge exchange.

### 2.2.4 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. Hitachi's WS4 work supports WS1 and WS2 through the development of the Trials Operational Applications (i.e. the depot optimisation system and flexibility services) and the Site Planning Tool. WS4 also supports WS3 through the development of the data analysis capability.

As part of this workstream UK Power Networks is developing the capability, within their systems, to receive and process profiled connection applications and manage the provision of flexibility services. 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.

#### *2.2.4.1 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 analytical tools and trials applications. Main Hitachi activities have included:

- **Data** – Update to some telematics data ingestors as a result of a system change made by a telematics platform provider and to enable greater data granularity. The data integration activity is now complete, though work continues to support the ongoing process.
- **Depot control** and **optimisation** – Designing and developing the system for planning and managing the charging of vehicles in a depot based on the Hitachi USP, as described in WS2.

- **Depot flexibility** – Designing and implementing the flexibility service provider part of the depot application and the interface with UK Power Networks' ANM system.
- **Data science** – Supporting the WS1,2 and 3 trials through data analysis, including exploratory work to understand the data being captures across the trials
- **Security** – Continued to run regular security working group meetings to maintain the security of the system.

UK Power Networks has:

- Continued to refine the design of its ANM system modifications to enable flexibility services within the trials and a baseline API specification has been issued out to the partners. The development of these modifications has been subject to delay but is now underway and expected to conclude at the beginning of Q4 2021, see Section 2.2.4.2 for further details.
- Identified the Strategic Forecasting System, under development, as the most relevant tool to take inputs from Hitachi's analysis and model wider network impact of fleet electrification.

Centrica have begun to develop the integration between their charging and flexibility platforms, as well as the integration with the ANM system.

### *2.2.4.2 Challenges & lessons learnt*

**Delays to UK Power Networks' ANM implementation in the LPN region**
As reported in the previous PPR, due delays to the business-as-usual development of UK Power Networks' ANM system, the project will instead be utilising a cloud version of the ANM system to provide the same functionality to the project. The development of the modifications to this system is ongoing, however during the detailed design stage, requirement for additional development time has been identified for the two closer to real-time flexibility products which will lead to a staged approach in the delivery of the flexibility products. The first flexibility product will be delivered ahead of the start of the trial and the project team are exploring options for trialling the remaining two flexibility products – this may involve a manual process until the ANM system development is completed, which is expected at beginning of Q4 2021. There have been some knock-on delays to the development of the interfaces between this system and the Hitachi/Centrica flexibility systems. The impact of these delays is being managed through the scheduling of the trials for WS1 and WS2.

**Implementation of solutions interacting with third party systems**
During this period a third-party telematics provider, on which the project relies for vehicle status data, changed their system without notifying the project. This resulted in a loss of connectivity for a period and additional work to integrate with the new service.

### *2.2.4.3 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.
- Defining a scope of works to enhance the Strategic Forecasting System to meet the project requirements and ensure its delivery

## 2.2.5 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 and evaluating the behavioural impacts on commercial EV use. 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:

- Further refined and baselined the TCO high level design and identified sources that will allow to refine the input assumptions. This includes data from the trials and external sources
- Defined scope for future business modelling work, and its relation to trials activity has been drafted
- Begun behavioural analysis work, including the design and execution of a series of questionnaires capturing the views and attitudes of drivers, fleet managers and other stakeholders on the EV transition of their fleets. The initial response to these surveys is now being analysed.

UK Power Networks has provided a network connection cost model, which indicates an indicative connection cost estimation depending on basic connection parameters.

## 2.2.6 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 this PPR and preparation has begun for Deliverable D3, *Learnings from installation and commissioning*. All future Optimise Prime deliverables remain on track and their status can be found in Section 6.

During the next reporting period WS6 will publish Deliverable D3 by 27 August 2021 and will begin the preparation of Deliverable D4, Early Learnings Report on the Trials.

## 2.2.7 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.

### *2.2.7.1 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
- **Resourcing** – Supporting the resourcing of all project 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 regular 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.

#### *2.2.7.2 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.

#### *2.2.7.3 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 out of the build and test phase and the WS1 and WS2 trials can begin.

As the project's experiments start to generate learnings of interest to the industry the workstream will increasingly focus on developing and managing the project's programme of dissemination activities.

### *2.3 Business case update*

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. However, 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 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*

Progress in this period has been good and has principally focussed on readying all trial applications and infrastructure to enable the WS1 and 2 to start on time in July 2021. In advance of this, initial trial experiments have taken place across all workstreams to help build baselines for comparison and to allow the project to further refine the trials methodology. Some outstanding work remains in the development of flexibility functionalities and flexibility experiments have been scheduled to allow the trial period to begin.

WS3, mixed trials, has continued to make excellent progress. While there has been some impact from the COVID-19 lockdowns, the project has continued to collect data from relating to the journeys of over 1,000 EVs each week and over 1,500 EVs are now on the road. The data analysis team has continued to carry out analysis of the data collected and has developed models to derive charging activities from charging behaviour, model demand for charging and overlay this onto network capacity data.

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)** | | |
| Execute initial trial experiments | | Experiments have begun in WS1, 2 and 3 |
| **WS1 Home trial** | | |
| Confirm minimum EV rollout | | Complete. The minimum requirement has been met. |
| Home trial charging technology rollout | | Chargers have been installed to support the vehicles rolled out |
| Implement trial technology solution | Driver app | In use |
| | System integration and testing | Data capture from EVs and CPs is ongoing.<br>Flexibility function is under development, aim to complete in Q3 2021. |
| **WS2 Depot trial** | | |
| End-to-End testing and commissioning | Testing of control of EV charging infrastructure at depot sites | All systems installed and final commissioning underway at seven depots.<br>Final tests at two additional OTA sites due to complete in July. |
| Depot Planning & Optimisation Systems | Build and Test | In progress. Expected completion of core functionalities by end of Q2 |
| Confirm minimum EV rollout | | Complete. Minimum vehicle requirement has been met |
| Depot planning tool | Build web-based site planning tool | Site planning tool built and undergoing testing |
| **WS3 Mixed trial** | | |
| Confirm EV rollout (Mixed trial) | | Complete. Minimum vehicle requirement exceeded |
| 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 and is proceeding to plan |

| Task name | Sub-activities | Status at end of period |
|---|---|---|
| **WS4 IoT Platform, Network Forecasting & Flexibility Analysis** | | |
| Analytics platform – develop & test | Detailed design and build of the analytics platform | Complete |
| | Build of data ingestors | Complete |
| Flexibility functionalities | Build and Test | In progress, completion delayed into Q3 |
| ANM modification | Design, Build, Test | In progress, completion delayed into Q4 |
| **WS5 Business Model** | | |
| High Level TCO Model | Draft model | Model baselined |
| Behavioural Analysis | Questionnaires and analysis | First questionnaires ran at Centrica, Royal Mail and Uber |
| **WS6 Reporting & Deliverables** | | |
| Deliverable D3 | Compile deliverable | In progress, due for publication 27 August 2021 |
| PPR June 2021 | 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 | Detailed design of Flex Products | Flexibility products design completed. |
| 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:

- Minor changes to WS1, 2, 3 and Depot Planning activities timing to reflect actual progress
- Delay to ANM and FSP flexibility development in WS4. As a result, the project team are exploring options to carry out the initial stage of the flexibility trials which may involve a manual process for Products B & C.

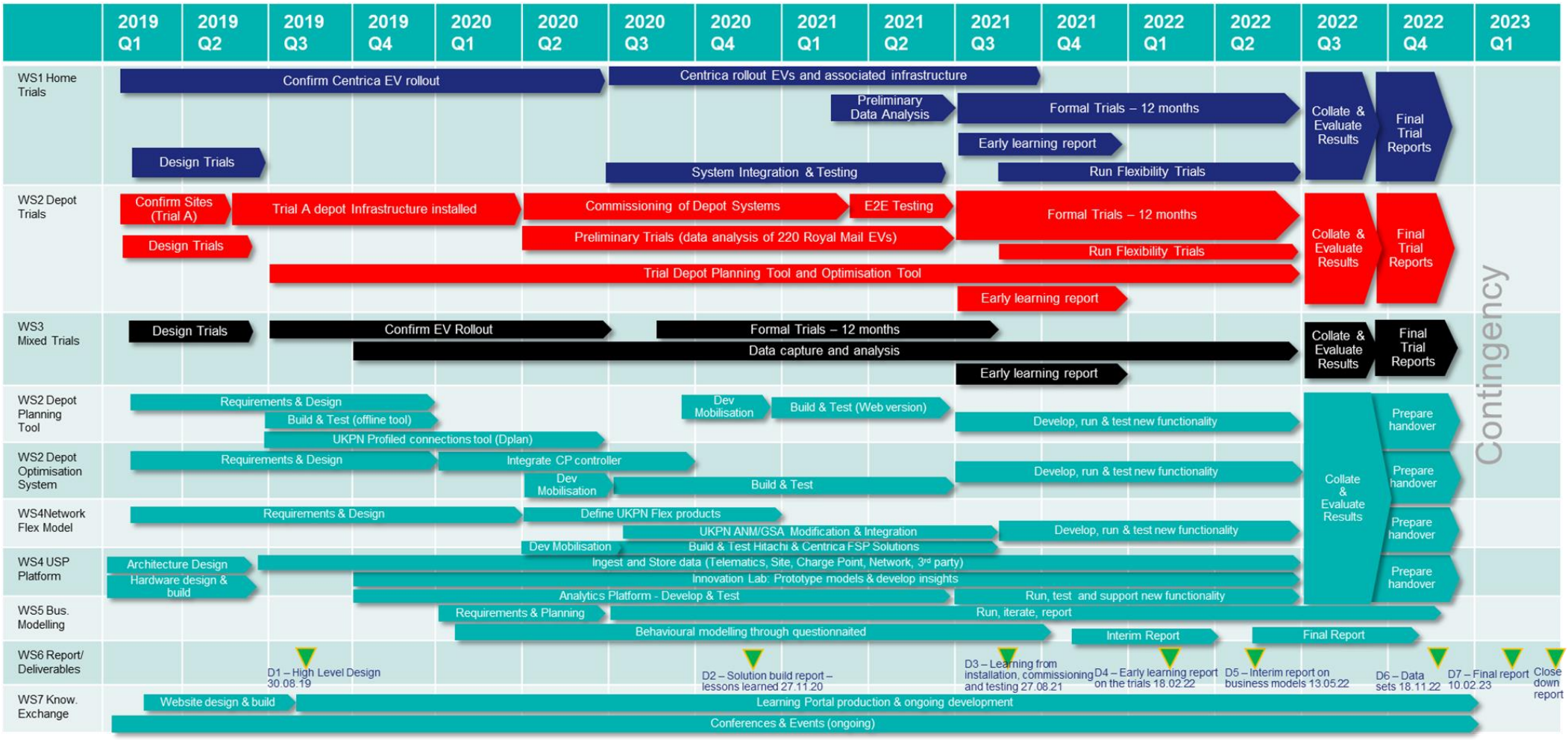


**Figure 7 – Summary Project Plan**

## *3.3 Identification and management of issues*

Ensuring 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 was previously identified as a key risk to the project. This issue was closed in the previous PPR and since then the project remains on track to exceed the minimum number of vehicles by the time the trial period starts on 1 July.

No further significant issues have been identified in this reporting period. 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
  - Start of the trial period, data gathering, analysis and trials activity
  - Completion of the testing and commissioning of the integration between the ANM system, Centrica's flexibility platform and the charging management platform to enable flexibility experiments.
- WS2 – Depot Trials
  - Start of the trial period, data gathering, analysis and trials activity, including real time optimisation of charging at Royal Mail depots in line with profiled connections
  - Complete installation of LV monitoring equipment at trial sites
  - Completion of testing and commissioning of the integration between the ANM system, and the depot management platform to enable flexibility experiments.
  - Testing, use and evaluation of the 'Site Planning Tool'
- WS3 – Mixed Trials
  - Continue to capture and analyse journey data
  - Continue executing mixed trial experiments
- WS4 – IoT Platform, Network Forecasting & Flexibility Analysis
  - Continued maintenance and ongoing development of platform and applications.
  - Maintenance and development of the analytics solution
  - Completion of modifications to UK Power Networks' ANM system to meet the requirements of the flexibility experiments
  - Development of enhancements to UK Power Networks' Strategic Forecasting System
- WS5 – Economic Analysis & Business Models
  - Continued behavioural analysis through surveys
  - Business modelling activity based on findings from the trials
- WS6 – Reporting & Deliverables
  - Complete Deliverable D3 (due 27 August 2021)
  - Begin drafting Deliverable D4 (due 18 February 2022)
- WS7 – Project Management & Sharing Learning
  - Continue to monitor project progress and budgets
  - Continue to update the project website
  - Monitoring of trial progress and planning of enhancements
  - 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 2 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 up to 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 2 – 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 | In progress, on track |
| 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:<br>• A summary of the work undertaken<br>• The insights gained from the trials<br>• Recommendations and likely costs and benefits<br>• Models for use of commercial EV flexibility by DNOs.<br>• Recommendations on business models<br>• How the trials, the infrastructure and technology should be transitioned after the project has completed and<br>How to ensure integration of the Methods with DNO/DSO systems and processes | 10 February 2023 | Not yet due to start |

| Deliverable | Description | Due Date | Status |
|---|---|---|---|
| Comply with knowledge transfer requirements of the Governance Document | 1. Annual Project Progress Reports which comply with the requirements of the Governance Document<br>2. Completed Close Down Report which complies with the requirements of the Governance Document<br>Evidence of attendance and participation in the Annual Conference, as described in the Governance Document | N/A | 2019 and 2020 reports published. This report, together with the December 2021 report will meet the 2021 requirement<br><br>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. As the programme enters the trial phase the twitter account https://twitter.com/optimise_prime will share updates on the progress of the trials.

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:

- A feature on the project was published in the February Edition of Fleet News
- UK Power Networks presented an update to the Cornwall Insights EV Charging and Infrastructure Forum, January 2021
- UK Power Networks, Royal Mail and Uber and presented Optimise Prime as a case study at the everythingEV conference, 20 April 2021
- Hitachi and UK Power Networks worked with Digital Europe to produce a short film profiling the project as part of their *Digitally Enlightened* series

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 3), and any relevant IPR that is forecast to be registered in the next reporting period (Table 4).

**Table 3 – IP generated last period (January – June 2021)**

| IP Description | Owner(s) | Type | Royalties |
|---|---|---|---|
| Flexibility High Level Design | Hitachi, UK Power Networks, SSEN, Royal Mail | Relevant foreground IPR | Nil |
| Optimise Prime API Specification | UK Power Networks | Relevant foreground IPR | Nil |
| Optimise Prime Flexibility Product Design | UK Power Networks, Hitachi | Relevant foreground IPR | Nil |
| Optimise Prime Site Planning Tool | Hitachi, UK Power Networks | Relevant foreground IPR | Nil |
| TCO Model – High level design | Hitachi, UK Power Networks, Royal Mail | Relevant foreground IPR | Nil |

**Table 4 – IP forecast next period (July – December 2021)**

| IP Description | Owner(s) | Type |
|---|---|---|
| Optimise Prime Depot Management System | Hitachi | Relevant foreground IPR |
| Deliverable D3 | All project partners | Relevant foreground IPR |

# 10 Risk Management

Table 5 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 December's PPR the project has identified risks R056 to R063. The project continues to monitor risks and issues through regular risk management meetings. Following each meeting risk impacts and mitigation plans are updated. Twelve risks have been closed over this period, due to the risk passing or having been successfully mitigated. Risks closed in previous reporting periods are omitted.

**Table 5 – 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<br>Budget updated in November 2018 for contracts<br>Budget is updated each month for actuals and new forecasts, with a new baseline every quarter.<br>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<br>05/06/20 – Risk of further cost overrun reduced by decision to alter EV targets<br>10/02/21 – Delay in completion of ANM flexibility features may require TOA team to be engaged for longer<br>13/05/21 Exploring options but flexibility trials may involve manual process for products B&C, currently impacting cost. | High | High | Negligible | Open | PM | 13/05/21 | |
| 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.<br>- 21/04/21 The majority of this risk has now passed without issue or is successfully mitigated. There is still the remaining inherent risk that an issue could occur e.g. SetPoint processing interval constraints, reducing probability | High | Low | Low | Open | TDA | 13/05/21 | |
| 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.<br>- 25/11/19 – New partners may not use CPC, requiring integration with third party systems<br>- 21/10/20 Delays to LPN ANM solution implementation may impact methods. Mitigation by using ANM in SPN area and alternative solution elsewhere<br>- 16/11/20 Cloud hosted ANM system will be used by UK Power Networks for Optimise Prime<br>14/04/21 – Risk remains open until all Flexibility efforts are complete<br>13/05/21 – Considering different options including setting up a manual based flexibility trial design for Products B & C, allowing lessons to be learned for full implementation. | High | Low | High | Open | PM | 13/05/21 | |

| ID | Name | Risk Description | Mitigation/Comments | Impact on Cost | Probability | Impact on Schedule | Status | Owner | Last Review | Closure |
|---|---|---|---|---|---|---|---|---|---|---|
| R004 | Solution does not deliver anticipated outcomes | Lower than expected value delivered | Trials design agreed on 07/06/19.<br>Trial and solution design is clearly defined following set methodology clearly linking activities with outcomes.<br>Designs are agreed with relevant Partners and linked to FSP commitments.<br>Solution design and business case regularly reviewed throughout the project lifecycle and changes are made where needed<br>Review of each Deliverable by UK Power Networks prior to submission to Ofgem to ensure the solution delivers the outcomes<br>25/11/19 Independent assessor has not raised issues with trials/solution design<br>22/05/20 – Imperial College review supports statistical significance of the trial methods to meet learning objectives<br>13/04/21 – Outcomes are under consistent report as experiments and deliverables are published, the control is to continually ask within these periods whether the project is still on target to meet the expected outcomes<br>13/05/21 Looking at benefits management to better measure progress to outcomes | Negligible | Low | Negligible | Open | PM | 13/05/21 | |
| R005 | Partner performance is not contractually defined | Outputs delayed or inadequate and potential overspends | Weekly meetings with Project Partners,<br>Suitable incentives where required<br>Shared responsibilities for deliverables<br>Contracts signed on 18/03/19<br>Partner remain committed and performance is tracked by weekly meetings and programme governance | Medium | Low | Medium | Open | PM | 13/05/21 | |
| R006 | Suitable equipment suppliers cannot be found | Project will be delayed or require re-scoping | Realistic requirements specified at FSP.<br>Early consultation with suppliers.<br>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<br>22/04/20 – Made negligible as do not see need for more suppliers/equipment at this time<br>13/04/2021 Risk to remain open until all equipment in place | Low | Negligible | High | Open | PM | 13/05/21 | |

| ID | Name | Risk Description | Mitigation/Comments | Impact on Cost | Probability | Impact on Schedule | Status | Owner | Last Review | Closure |
|---|---|---|---|---|---|---|---|---|---|---|
| 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.<br>Realistic requirements specified at FSP.<br>12/03/20 – Hitachi pilot site installed and ready for testing<br>10/02/21 Trowbridge testing ongoing, site chosen for RMG on site tests<br>16/03/21 Initial end-to-end testing has been carried out at Orpington and Bexleyheath depots<br>13/04/21 – Operations lead now has a detailed plan to test all equipment prior to trial commencement which has broad support, leaving risk open until tests are executed against that plan<br>13/05/2021 Additional 2 OTA sites are being enabled by end of May, subject to that happening those sites will also be tested prior to trial commencement. | High | Low | Medium | Open | PM | 13/05/21 | |
| 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<br>Weekly status reports with the Partners, and quarterly governance meetings to assess performance.<br>Do not expect any existing partner to withdraw | Medium | Low | High | Open | PM | 13/05/21 | |
| 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<br>05/09/19 – Seven sites agreed for RMG Trial A.<br>12/03/20 – RMG won't run trial B sites, suitable sites will need to be identified with new trial participants if secured<br>22/04/20 – Centrica will roll out vehicles throughout GB that may be able to join trials<br>21/10/20 – Royal Mail trial sites do not include rural depot. Data from rural depots will be analysed as recommended in statistical report.<br>21/10/20 – Delay to LPN ANM may cause impact on trial start times at some sites. Investigating mitigations.<br>10/02/21 – Cloud ANM will cover all areas<br>13/04/21 All Royal Mail sites are now understood, additional sites potentially come into scope including the 2 x OTA sites. Closing Risk. | Medium | Medium | High | Closed | PM | | 13/04/21 |
| 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 | 13/05/21 | |

| 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.<br>27/06/19 – Technical Delivery plan created, close collaboration with Development team in Lisbon set up.<br>14/10/19 – Planning work completed in September 2019, regularly revise based on progress<br>12/03/20 – Tech team rolled off. Resumption dependent on fleet progress<br>22/05/20 – Deliverables delayed to accommodate delayed technology build caused by EV availability<br>01/09/20 – Applications development re-started and replanned to meet new trial start deadline.<br>10/02/21 – Final build of flexibility solution may be impacted by delayed ANM Flexibility build<br>16/03/21 – D3 deadline and trial scheduling should mitigate ANM delays, however there is uncertainty over whether Centrica will be able to deliver flex integration in time for D3<br>21/04/21 – Both Centrica and SGS have produced tentative plans that deliver into August/September or will have impact to the trials period<br>13/05/21 SGS delivery of full implementation of flexibility products B&C is due early October. The project team are exploring options to start the trial as planned including utilising a manual based approach. | Medium | High | Medium | Open | TDA | 13/05/21 | |
| 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.<br>22/04/20 – Pilot site in place, insurance in place, no issues to date & minimal risk – change to negligible | High | Negligible | Low | Open | Trial Operations PM | 13/05/21 | |
| 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.<br>Centrica EV procurement delayed.<br>Royal Mail no longer procuring Trial B vehicles. | Work with Partners in the early stages to ensure plans are realistic and build in contingency.<br>Project will work with Hitachi Capital and new participants to endeavour to meet the volumes.<br>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<br>Revised to Low as further change is now less likely.<br>13/04/2021 – Statistically significant volumes from RMG with a further 70 vehicles confirmed for May, Risk Closed | Medium | Low | High | Closed | PM | | 14/04/21 |

| ID | Name | Risk Description | Mitigation/Comments | Impact on Cost | Probability | Impact on Schedule | Status | Owner | Last Review | Closure |
|---|---|---|---|---|---|---|---|---|---|---|
| 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.<br>22/04/20 – all equipment except load/connection monitoring in place for WS2 Trial A. Commissioning and WS1 progress paused by COVID-19.<br>22/05/20 – Measures now in place to resume work safely.<br>13/04/2021 Risk to remain open until Panoramic Power installs are complete and VisNet hubs are installed<br>13/05/21 – Panoramic Power now all installed, VisNet surveys are now ongoing. | Low | Medium | Medium | Open | PM | 13/05/21 | |
| 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 OZEV. Lobby where necessary.<br>12/03/20 – discussion held with TfL re. congestion charge impacts<br>22/05/20 – TCO model being updated to reflect current subsidy environment<br>13/04/2021 – Risk will no longer impact programme although may skew business cases around future EV adoption, however OZEV status will be factored into the Business Models concerning TCO so on that basis risk will be closed. | High | High | Low | Closed | PM | | 14/04/21 |
| 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 OZEV. Lobby where necessary. | High | Low | Low | Open | PM | 13/05/21 | |
| 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.<br>Project is continuously reviewing circumstances, assessing risks and impact, preparing different options and involving Project Board in decision making.<br>Ofgem is notified of changes and consulted where necessary | High | Low | Negligible | Open | PM | 13/05/21 | |

| ID | Name | Risk Description | Mitigation/Comments | Impact on Cost | Probability | Impact on Schedule | Status | Owner | Last Review | Closure |
|---|---|---|---|---|---|---|---|---|---|---|
| R029 | WS1 – EV targets are not met | Potential that WS1 is unable to meet EV targets due to factors outside Project control,<br>EU CAFE regulations place obligations on vehicle OEMs that may encourage them to delay new ultra-low carbon LCV launches into 2020<br>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<br>30/04/19 Fortnightly meetings taking place<br>14/06/19 – Draft Strategy produced and a list of target potential participants being pursued.<br>29/11/19 – Targeted spend option chosen to give time for vehicle procurement<br>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<br>17/07/20 – Centrica have announced order for 1,000 vehicles and should now meet project requirements. Probability changed to Low.<br>16/11/20 – Centrica have confirmed plans for 2020 and committed to regular rollout progress reports<br>13/04/21 – On track for minimum before July and all vehicles by September | High | Low | High | Open | PM | 13/05/21 | |
| 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<br>-Uber issued 2-month licence extension by TfL 24/09/2019<br>-TfL revoked Uber's Licence 25/11/2019 | Uber vehicle growth on target<br>25/11/19 – Uber are appealing decision of TfL not to grant license in London. Continuing to operate until appeal decided – See R047<br>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<br>29/09/20 – Uber to be granted new license. EVs on road exceed 1,000. Risk downgraded to negligible.<br>13/04/21 – Exceeding 1500 vehicles, risk very negligible.<br>13/05/21 – Closed as target significantly exceeded. | High | Negligible | High | Closed | PM | | 13/05/2021 |

| 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.<br>Project will work with Hitachi Capital and new participants to endeavour to meet the volumes. Stage Gate process in place.<br>New trial participant on-boarding work begun<br>29/11/19 – Targeted spend option chosen to give time for vehicle procurement<br>22/04/20 – all 220 Trial A vehicles on road<br>22/05/20 – Exploring number of vehicles required for statistically significant results<br>11/06/20 – Revised EV targets will reduce risk as current volume exceeds statistical minimum. Probability changed to Low.<br>16/09/20 – Royal Mail may add small number of EVs at existing sites during next year<br>13/04/2021 Royal Mail are still on track for 70 additional vehicles by end of May with 12 additional vehicles in use in the OTA sites. Risk diminishing. | High | Negligible | High | Open | PM | 13/05/21 | |
| 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<br>14/10/19 – Candidate solution being investigated.<br>12/03/20 – Load monitoring ordered and site surveys done. Awaiting install<br>13/10/20 – All sites except Mount Pleasant online. Chasing Centrica to resolve<br>13/04/2021 Monitoring due to be installed at remaining two sites by end of April, at which point risk can close<br>13/05/21 Closed – Panoramic power installed at all sites | Low | Low | Low | Closed | Trial Operations PM | | 13/05/21 |
| 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.<br>12/03/20 – Strategy to test at test site then at one depot before wider rollout<br>13/04/2021 – Risk closed as a result of full understanding of all RMG target sites, including OTA locations and full understanding of differences between them for the project | Low | Low | Low | Closed | Trial Operations PM | | 13/04/21 |

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|---|---|---|---|---|---|---|---|---|---|---|
| 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 27/08/2020. 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.<br>14/10/19 – Likely that D2-7 will be delayed while EV numbers are confirmed<br>29/11/19 – Delay agreed at board meeting, re-planning to take place<br>20/02/20 – Ofgem informed of change, will continue to monitor in case of further challenges<br>21/10/20 – Potential for ANM system delay in LPN to risk not completing before D3 due<br>16/11/20 – UK Power Networks exploring use of cloud hosted ANM system<br>13/04/21 – Risk remains until Centrica and UK Power Networks integration is complete (currently on track well ahead of D3)<br>13/05/21 – Will satisfy D3 requirements by integrating flexibility products A and B. | Low | Low | Medium | Open | PM | 13/05/21 | |
| 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<br>23/09/19 – Identifying resource requirements for integration and testing of project systems and infrastructures.<br>14/10/19 Dialogue ongoing between Hitachi, UK Power Networks and Centrica.<br>12/02/20 – Draft plan completed for discussion – UK Power Networks planning ANM developments<br>22/04/20 – Further flex meetings with Centrica. R32 merged to remove duplication.<br>22/05/20 ANM systems vendor carrying out work to capture detailed requirements for integration of the partner systems<br>16/09/20 – First draft of flex design is written and being reviewed.<br>16/03/21 – API spec received and design being updated<br>13/05/21 – Risk remains until integration is complete | Medium | Medium | Medium | Open | PM | 13/05/21 | |

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|---|---|---|---|---|---|---|---|---|---|---|
| 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.<br>13/04/21 – Project is not testing any profiled connections outside of the summary agreed capacity. No sites exist with more capacity required than available.<br>13/05/21 – Closed – no possibility to exceed connection limit on sites | Low | Low | Medium | Closed | UK Power Networks PM | | 13/05/21 |
| 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.<br>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<br>05/06/20 – Project board decision to re-size trial samples alleviates this risk.<br>09/06/20 – Ofgem meeting held where Ofgem were positive towards resizing trials as long as deliverables were not affected.<br>17/07/20 – Centrica have placed order for 1,000 vehicles. Probability changed to Low<br>13/10/20 – Uber licence renewed, all trials are committed to exceed minimum vehicle numbers.<br>13/04/21 – Closed – all on track, any remaining issues being managed under risks 29, 30 and 31 | High | Low | High | Closed | PM | | 13/04/21 |
| 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.<br>23/06/20 – Discussing potential to test control via back office with CPO providers as alternative method<br>16/11/20 – Awaiting costs and timeframes<br>11/02/2021 Working more closely with CPOs to resolve issues and implement over air functionality.<br>13/04/2021 Trials Operations lead will continue to work with all suppliers etc. to monitor risk level | Low | Low | Low | Open | Design Auth. | 13/05/21 | |

| 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<br>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.<br>07/04/20 – Site works suspended. Centrica warn that lead time on vehicles likely to extended and other works delayed.<br>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<br>11/06/20 – Board decision to re-size trials mitigates some risks regarding finding partners, changed probability to low<br>13/10/20 – Risk remains but is low as all partners have or are committed to have vehicles.<br>16/11/20 – Second lockdown started – no major impact yet, continuing to monitor<br>08/12/2020 – Lockdown passed with no material impact.<br>07/01/2021 – 3rd Lockdown entered. Has resulted in reduction in Uber trips and is likely to have an impact on development efficiency<br>16/03/2021 Uber trips now recovered. Royal Mail Depot questionnaires delayed (see R59)<br>13/04/2021 The continued global effects on supply chains and UK based restrictions still have impact on the programme although general signs are good, the risk will remain | Negligible | Medium | Medium | Open | PM | 13/05/21 | |
| 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.<br>14/12/20 – Confirmed no impact on project – closed | Low | Low | Low | Closed | PM | | 14/12/20 |

| ID | Name | Risk Description | Mitigation/Comments | Impact on Cost | Probability | Impact on Schedule | Status | Owner | Last Review | Closure |
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| 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<br>21/10/20 – Site visit with Swarco has identified issue and upgrade is being rolled out to all CPs. Awaiting testing.<br>16/11/20 – Fix has been tested at Trowbridge and appears to have resolved issue. Monitoring.<br>11/02/21 – Proceeding with OTA to connect remaining Whitechapel CPs<br>13/04/21 – Risk will be closed once all OTA site CPs fully tested | Negligible | Low | Low | Open | PM | 13/05/21 | |
| 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.<br>16/09/2020 – Static IPs have been established to resolve this issue and prevent reoccurrence.<br>13/04/21 – Continuing to manage relationship with suppliers where required. | Low | Medium | Low | Open | PM | 13/04/21 | |
| 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.<br>16/03/21 – Due to age of electrical installation at some sites, installation may take longer than originally planned<br>14/04/21 – Risk remains until hubs are installed<br>13/05/2021 – Site surveys are in progress to identify any enabling works to install the equipment. Continuing to monitor the risk. | Low | Medium | Medium | Open | UK Power Networks PM | 13/05/21 | |
| R056 | Impact of Brexit on the Project | Risk of Brexit deal impacting availability of vehicles to partners, delivery schedules or costs | 08/12/20 – Orders placed and largely outside project control<br>07/01/21 – Deal agreed, sufficient vehicles are in the UK to satisfy minimum requirements. Changed to low.<br>14/4/21 – Remains open but unlikely to impact due to residual risks in global vehicle supply chain.<br>13/05/21 – Minimum vehicle numbers reached – closed | Low | Low | Medium | Closed | Hitachi PM | | 13/05/21 |

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|---|---|---|---|---|---|---|---|---|---|---|
| R057 | Change of Project Manager at Partner | Project manager leaving, risk of loss of knowledge or efficiency | 07/02/21 Frequent contact to ensure successful handover and ongoing support.<br>11/02/21 PM left following handover; project sponsor remains for any escalation needed.<br>13/04/21 Closed as no notable impact has occurred. | Low | Medium | Medium | Closed | Hitachi PM | | 13/04/21 |
| R058 | Support for container platform | Due to project extension the container platform is reaching end of life and requires replacement or extended support arrangements | 01/03/21 – Hitachi team are reviewing options<br>12/04/21 – Options plan due, considering outage risk<br>13/05/21 – Plan being developed to mitigate risk | High | High | High | Open | Platform PM | 13/05/21 | |
| R059 | Royal Mail – Delay to behavioural analysis work | COVID restrictions restrict ability to do face to face questionnaires with drivers. Internal pressures may limit availability of managers to complete questionnaires. | 01/03/21 – Making questionnaires available to Royal Mail, following up regularly<br>13/04/21 – Permission to proceed with surveys granted, some will be on paper<br>13/05/21 Behavioural surveys new commenced at RMG sites. Closed. | Negligible | Medium | Medium | Closed | Bus Model PM | | 13/05/21 |
| R060 | Delivery of Optimise Prime ANM Schemes Delayed | Subcontractor requires additional time to complete design of Flexibility Services requirements leading to delays in delivery of the ANM schemes for pre-trial activities, start of trials and meeting requirements for Ofgem Deliverable D3. | 16/04/21 – Working to ensure MVP requirements are delivered to meet start of trials and Ofgem D3 requirements. End of Sprint demos during development, enhanced configuration process and combining/streamlining FAT, Pre-prod and prod testing to identify and resolve issues earlier in development cycle.<br>30/04/21 – Will perform the first tranche of product B&C formal flexibility trials in a fully manual process. Integration will be expedited to meet deliverable C requirements. | High | High | High | Open | UK Power Networks PM | 13/05/2021 | |
| R061 | UKPN IS documentation requirements delaying integration of VisNet Hub to ANM Strata | UKPN IS has flagged up the need to produce IS related documentation for Optimise Prime which will take time & effort. This will lead to delay in carrying out integration work between the VisNet Hub and In-Cloud ANM Strata possibly delaying trials. | 16/04/21 – Discussing with IS to explore options to address this requirement such as using the existing ANM IS documentation artefacts but adding an Appendix to capture Optimise Prime architecture<br>13/05/21 – Architecture documentation is in progress | Medium | High | Medium | Open | UK Power Networks PM | 13/05/2021 | |
| R062 | Royal Mail – amendment agreement sign-off delay | More detailed information on the scope LV monitoring works is needed in the amendment agreement. The installation of the LV monitoring equipment cannot take place until agreement is signed off from all parties. | 16/04/2021 – Carry out site surveys as soon as possible to capture the scope of works at each site. Prioritise installation of the VisNet Hub at Dartford.<br>13/05/2021 – RMG to agree a contract which allows installations to be performed on a per-site basis. | High | High | Medium | Open | UK Power Networks PM | 13/05/2021 | |
| R063 | Setpoint Spacing Constraint – Depot Control | Through testing it has emerged that there is a constraint on the frequency of setpoints that can be sent to charge points. There needs to be a minimum spacing between the setpoints sent to each charge point and socket. | 12/05/2021 – Minimum spacing between setpoint requests confirmed for each charge point type. A control strategy has been drafted to respect this limitation and it is not expected that this will impact ability to respond to flexibility events. The changes will require more development time. Remains open until tested. | Low | High | Low | Open | Hitachi PM | 13/05/2021 | |

# 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 …Suleman Alli……

Position Director of Customer Service, Strategy, Regulation and IS

Date ……17th June 2021……