



**NIC Project UKPNEN03**

**Project Progress Report**

**December 2022**



Optimise Prime



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## Table of acronyms

Acronym	Full form
ANM	Active Network Management
CP	Charge Point
CPO	Charge Point Operator
CSMS	Charge Station Management System
DNO	Distribution Network Operator
DSO	Distribution System Operator
EV	Electric Vehicle
FSP	Full Submission Pro-forma
GB	Great Britain
GSA	Geospatial Analytics
ICEV	Internal Combustion Engine Vehicle
IoT	Internet of Things
IP(R)	Intellectual Property (Rights)
IT	Information Technology
NIC	Network Innovation Competition
OZEV	Office for Zero Emission Vehicles
PH(V)	Private Hire (Vehicle)
PM	Project Manager
PPR	Project Progress Report
RAID	Risks, Assumptions, Issues and Dependencies
RMG	Royal Mail Group
SFS	Strategic Forecasting System
SSEN	Scottish & Southern Electricity Networks
TOA	Trials Operational Applications
TCO	Total Cost of Ownership
UK	United Kingdom

## Glossary of terms

Term	Definition
Trial Period	A 12-month period of trialling for each workstream when the minimum quantity of 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
Product A	A firm forward option flexibility product, procured in advance
Product B	A day-ahead spot market flexibility product
Product C	An intraday balancing flexibility product

# 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 Novuna.

The project gathered data from over 6,000 EVs driven for commercial purposes through three trials. Optimise Prime also implemented a range of technical and commercial solutions with the aim of accelerating the transition to electric for commercial fleet operators while helping Great Britain's (GB) 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 was 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 is seeking 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 seventh Project Progress Report (PPR) for the Optimise Prime Network Innovation Competition (NIC) project, covering the six-month period between 18 June and 2021 and 17 December 2022. This document will, together with the June 2022 report, fulfil the reporting requirements of Sections 8.11 – 8.15 of v3.0 of the NIC Governance Document for 2022. 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 made significant progress in the last six months. All three trials have concluded and activity has turned to the analysis of the data collected and documentation of project learnings and recommendations.

Over this period, the project has successfully:

- Completed the three trials at the end of June 2022 and began the process of decommissioning systems
- Published Deliverable D6, consisting of datasets collected during the trials
- Analysed data from vehicles and charge points (CPs) involved in the workstream (WS) 1, 2 and 3 trials
- Concluded experiments to test the project's flexibility and profiled connection methods, modelled the impacts of the Optimise Prime methods on the distribution network and discussed how these methods could be implemented with UK Power Networks and SSEN experts
- Undertook and analysed further behavioural surveys with fleet drivers
- Updated analysis of factors that impact the total cost of ownership (TCO) and business models
- Updated the project's Site Planning Tool and transferred it to UK Power Networks' website
- Continued with the dissemination of the project learnings through webinars, with Project Charge, and social media publications and videos
- Managed the project, 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 trial), Centrica ended the trials with over 1,000 EVs on the road, around 900 of which were charged at drivers' homes and able to take part in flexibility trials. The remainder of the fleet made use of public charging. Centrica shared charger and telematics data regularly with Hitachi, covering the duration of the trial period.

A series of trials of flexibility products B and C (day ahead and intraday) were concluded at the start of this reporting period, with the trials ending at the end of June. Following this, focus turned to evaluation of the results of the trials, producing analysis of home load and flexibility services results that will be published in Deliverable D7.

The WS2 depot trial concluded with over 300 EVs operating from nine Royal Mail sites. The Royal Mail sites in WS2 participated in trials of both Profiled Connections and Flexibility products A and B (month ahead and day ahead), with the sixth and final round of trials coming to an end during this period. The results of these experiments have shown that the sites are able to respond to demand signals, with further analysis work during this reporting period considering how the availability of flexibility services can be maximised through appropriate

product design. Decommissioning work has taken place to revert the depots to control from the charge point operators.

The web-based Site Planning Tool (<https://www.ukpowernetworks.co.uk/optimize-prime/site-planning-tool-introduction>) has been updated during this period in response to users' feedback, and has also been used to model the requirements of a number of additional depots that Royal Mail are planning to electrify.

In WS3 (the Mixed Trials utilising Uber trip data from London-based EVs), Uber ended the trials with over 6,000 EVs on their platform in London. Throughout the project Uber has collected and anonymised trip data from EVs. During this period this has allowed the project to update analysis of current charging demand, while creating forecasts for future demand and network impact based on Uber's EV growth plans and UK Power Networks' and SSEN's secondary substation data.

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 platform team continued to support the ongoing operation of the project platforms. Planning has taken place for decommissioning of systems, ensuring that necessary data will be preserved, while confidential data is destroyed in line with project agreements.

Hitachi and UK Power Networks have been working with Element Energy, who provide UK Power Networks' Strategic Forecasting System (SFS), to run network modelling based on data from the Optimise Prime trials. Following updates to the model, results of this analysis have been received and will be presented in Deliverable D7.

### **1.3.3 WS5 – Economic Analysis & Business Models**

The Economic Analysis & Business Models workstream has made updates to the TCO model, together with the fleet partners, taking into account the volatility seen in fuel and electricity markets in recent months, as well as the project's learnings around flexibility. The operating model for the electrification of fleets has also been updated and further surveys have taken place of drivers outside the project's fleets for comparative purposes.

### **1.3.4 WS6 – Reporting & Deliverables**

Deliverable D6, which consists of the project datasets, was published in November 2022. During the next period the project intends to publish Deliverable D7, final learnings and the close down report. Work on preparing these deliverables is at an advanced stage.

### **1.3.5 WS7 – Project Management & Sharing Learning**

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

Following a UK Power Networks tender in the previous period, CK Delta was selected to provide further external analysis based on project data. The work covered a number of areas, including comparison of project data with UK Power Networks' Envision network model. The outcome from this work will be shared in Deliverable D7.

The programme has continued with a series of knowledge exchange activities, as detailed in section 8, aimed at sharing the lessons learnt throughout the trials with project stakeholders, including a series of short films and industry webinars with SPEN's Project Charge.

## 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 10.

As the project nears completion, the risk profile continues to change and the number of risks has declined. The main risks that remain focus on delays to analysis that may delay the publication of results. Key risks and issues being managed during this period include:

- Resource constraints at project partners requiring re-planning of activities in order to ensure project objectives are met
- Changes in personnel at project partners potentially impacting upon project delivery
- Potential for delays caused by the COVID-19 pandemic.

These are being monitored and mitigated and, given the late stage of the project, it is not currently expected that they will result in further delay to project completion or overspend of the project budget.

## 1.5 Project Learnings

The project has continued to generate a wide range of learnings as the trials and accompanying business modelling activities have progressed.

The WS1 trials have shown that home charging commercial EVs can provide consistent and reliable flexibility services when aggregated. Time of use tariff based smart charging can also be used to shift peak demand, but the timing of the demand shift needs to be managed carefully to prevent higher peaks being created at other times – at very high levels of uptake this may result in peak demand increasing overall. This type of load shifting also requires a driver to choose a suitable tariff for benefits to be accrued.

Automating the reimbursement of charge-at-home electricity is necessary for larger fleets, and the management of this process is key for driver acceptance. Centrica has further developed their process to directly reimburse driver's electricity bills with the correct amount.

The proportion of a home charging fleet that can actually charge at home off street is limited for a variety of reasons, and this needs to be considered in planning fleet electrification. The project found that use of public charging has limited impact on operational schedules, but can potentially have a significant cost impact due to the higher cost of using public chargers.

In WS2 both profiled connections and flexibility products have been trialled. The depots have demonstrated the ability to provide flexibility services and adhere to connection profiles, but trials demonstrated that there are specific considerations for this type of fleet that need to be taken into account in flexibility and profiled connection design, such the length of time demand response can be sustained for, the timing of when flexible load is available and the ability of a fleet operator to accurately predict load.

It is more difficult to predict electricity demand at depots where CPs are shared between multiple vehicles because the number of vehicles plugging in on any specific day can vary. Small depots can be particularly hard to predict, because small changes in operations can result in large percentage changes in load. The Royal Mail fleet also showed significant changes in behaviour between seasons and across days of the week, which can impact provision of longer-term flexibility products because of how this affects the accuracy of demand forecasting and provision of service.

The WS3 analysis has focused on the impact of future electrification, the requirement for charging and impact on the network, in line with Uber's growth predictions. This has allowed the project to map the changing impact of PHV demand on the distribution network. A key forecast change is related to increasing battery capacity – as more vehicles can complete a full day without recharging. Demand for infrastructure is likely to shift from enroute facilities, in central areas, to charging stations closer to drivers' homes.

The TCO model has been evolved since the version published in Deliverable D5, taking into account the significant movements that have been seen in the price of fuel and electricity coupled with higher inflation. There have also been a number of changes to purchase incentives and taxation in recent months. While vehicle price is still the most important cost, especially for vans, the ability of lower running costs to offset this has reduced, as electricity prices rise.

Full details of the project's findings will be published in Deliverable D7 in early 2023.



## 2 Project Manager's report

### 2.1 Progress in this reporting period

The project has made significant progress during this reporting period and is currently on track to meet the project timelines. Significant progress made in this period includes:

- The conclusion of the project's three trials
- Capture of data from the trial period and publication in Deliverable D6
- Analysis of the captured data and results from trialling the project methods to develop insights that will be published in the final deliverable, D7
- The business model workstream has carried out further surveys of drivers and updated TCO assessments following changes in market prices.
- 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.

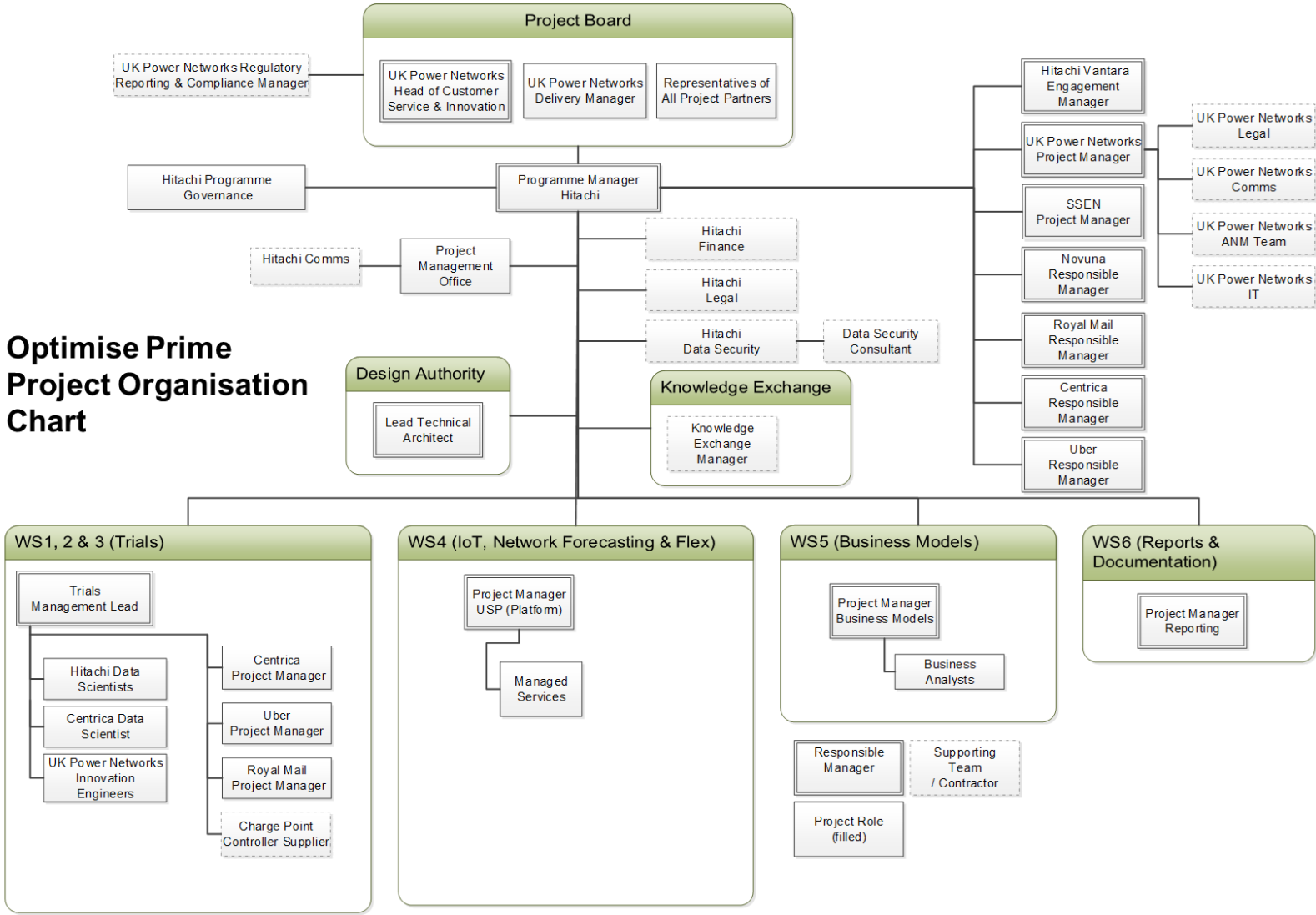
#### 2.1.1 Project Partners

Optimise Prime has continued to operate a project steering board, comprising all project partners on a quarterly basis. During this period meetings were held on 25 August and 8 December 2022.

In addition, a regular project progress reporting process is in place between Hitachi Europe, Hitachi Vantara, Royal Mail, Centrica, and UK Power Networks. All project partners continue to contribute to the Optimise Prime workstreams.

#### 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. As the trials have come to an end, the technical and operational support areas of the team have been scaled down to reflect the changing workload.



**Optimise Prime  
Project Organisation  
Chart**

**Figure 1 – Optimise Prime Organisation Chart**

## 2.2 Workstream progress

### 2.2.1 WS1 – Home trial

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

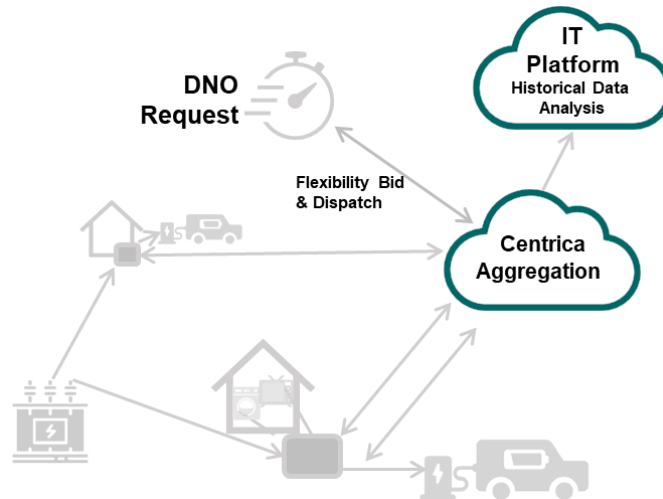


Figure 2 – Schematic of WS1 trial

#### 2.2.1.1 Progress in this reporting period

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

- **EVs** – Reached a total of over 1,000 EVs on the road in June 2022, before the end of the trials
- **CPs** – As the EV rollout has gone on, increasing numbers of drivers have made use of public charging as they are not able to install a CP at home – around 20% of drivers charge in this way at least some of the time
- **Technology** – Continued to operate a driver app as part of the CP control solution, and to capture data from CPs and vehicle telematics and provided this data for analysis and publication in Deliverable D6. Centrica has also further developed their home charging reimbursement system in order to directly refund drivers' electricity accounts
- **Flexibility** – Worked with Hitachi, UK Power Networks and SSEN to carry out the final round of flexibility trials for Product B and Product C. Following on from these trials, Centrica has been analysing and documenting the results of the flexibility events and EV load, which will be presented in Deliverable D7
- **Business Modelling** – Worked with Hitachi to develop updates to the TCO modelling, following changes to market conditions
- **Data** – Provided data from charging and telematics systems to Hitachi for analysis purposes.

UK Power Networks has:

- Carried out the tender, bid acceptance and flexibility dispatch activities for flexibility products B and C.
- Assessed delivery performance and settled all of the flexibility events.
- Participated in workshops considering the outcome of the analysis in order to form conclusions and recommendations for future flexibility products including home based fleets.

Hitachi has:

- Worked with Centrica, UK Power Networks and SSEN to plan and carry out the testing of flexibility products in WS1
- Received telematics and charging data and published this as part of Deliverable D6
- Analysed operational patterns of the British Gas fleet and combined this with Centrica's analysis of load and flexibility event as part of Deliverable D7
- Discussed the outcomes from the Centrica flexibility analysis with experts from UK Power Networks' flexibility team to develop recommendations for future products.

SSEN has participated in the flexibility experiments and has contributed to making recommendations based on the flexibility analysis.

### 2.2.1.2 *Challenges and lessons learnt*

Following the end of the trials, the technical challenges of delivering the products have now passed and work has moved on to analysing and presenting the results of the trials

A wide range of lessons have been learnt throughout the WS1 trial of Optimise Prime, and these will be reported in full as part of Deliverable D7. In summary, some key conclusions reached include:

- The trials with British Gas have shown that current EV models are suitable to replace the internal combustion engine vehicle (ICEV) fleet, and can carry out the same workload
- If left unmanaged, the home fleet created a concentrated load peak in the early evening, coinciding with the network peak
- Aggregated home-charged EVs respond well to requests for flexibility services, with a 95% success rate, and vehicles being able to respond within one minute
- Smart charging can also significantly reduce load at peak times, but if it is driven by a single price signal the ramp up can cause a significant secondary peak
- Load is seasonal, driven both by changes in shift patterns and variation in vehicle efficiency in line with changing temperature
- Charging load, and available flexibility, varies by day of the week due to variations in workload and associated daily mileage driven. Where there are longer gaps between shifts, such as weekends, drivers may choose to delay charging if it is not convenient. This needs to be considered in the design of flexibility products
- A significant amount of public infrastructure will be needed to support home-based fleets, as a large proportion will not be able to charge at home off street.

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

Work in WS1 is now largely complete. In the next reporting period, the final results will be published in Deliverable D7 and the Close Down Report.

## 2.2.2 **WS2 – Depot trial**

The depot trial, shown in Figure 3, implemented a range of technologies to allow depots to electrify economically by putting minimum additional peak load on the distribution network.

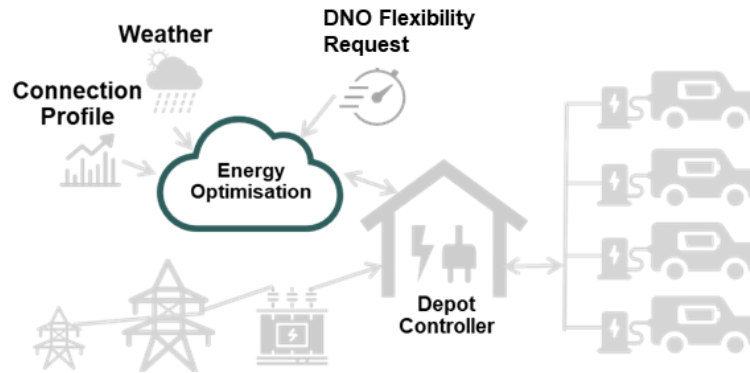


Figure 3 – Schematic of WS2 trial

### 2.2.2.1 Progress in this reporting period

In the depot trial, Royal Mail has:

- Continued to operate their fleet of EVs at the nine trial depots
- Supported Hitachi in the ongoing operation and maintenance of the depot charging systems and in keeping vehicle data up to date
- Provided data on further depots planned for electrification so the benefits of smart charging and profiled connections could be explored
- Contributed to the analysis of the trial experiments
- Provided input into updates to the development of the fleet charging guide and TCO models
- Worked with Hitachi to decommission parts of the trial infrastructure that were not required following the end of the trials.

Hitachi has progressed the following activities:

- **Depot optimisation** – Operated the depot management systems that captures charging data and implements flexibility products
- **Profiled connections** – Completed trials of profiled connections, flexibility products A and B and smart charging based on tariffs and state of charge
- **Data** – Completed the collection of data and compiled this for publication in Deliverable D6
- **Analysis** – Carried out analysis of the operational patterns, load monitoring and the outcome of profiled connection and flexibility trials. This analysis has been documented for publication in Deliverable D7
- **Recommendations** – Worked with UK Power Networks' subject matter experts to create recommendations based on the findings from the trials
- **Connections Planning** – Simulated electrification of a further eight Royal Mail depots using the site planning tool to create smart charging load curves
- **Site Planning Tool** – The tool was further updated based on user feedback, with the addition of a calculator for customers planning to install solar power alongside their EVs and a refreshed look. The tool has been transitioned to UK Power Networks, who will maintain it following the project. It can be found on the UK Power Networks website at <https://www.ukpowernetworks.co.uk/optimize-prime/site-planning-tool-introduction>
- **Decommissioning** – Decommissioned the trial infrastructure no longer required by Royal Mail, ensuring the continuing functioning of the charging infrastructure.

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

- **Flexibility trials** – Completed the tendering, dispatch and settlement of flexibility events
- **Profiled Connection trials** – Monitored adherence to profiled connections and sent out notifications in case of profile breach
- **Decommissioning** – Decommissioned VisNet devices used to monitor load at Royal Mail depots points of connection
- **Conclusions and Recommendations** – Worked with Hitachi and Royal Mail to form conclusions based on the outcome of the trials and create recommendations for future implementation of the methods by GB DNOs
- **Site Planning Tool** – Took ownership of the tool and created help pages on the UK Power Networks website
- **Connections Planning** – completed connection planning and cost estimation on further eight Royal Mail depots in order to compare base case and smart charged scenarios.

Within this reporting period, SSEN has conducted the following activities:

- Carried out the tender for flexibility events and joined workshops on the outcomes and recommendations from the trial of the project methods.

#### 2.2.2.2 *Challenges and lessons learnt*

A wide range of lessons have been learnt as part of the trials. The following lessons will be documented in Deliverable D7:

- Load profiles are depot specific, and can be impacted by a wide range of factors including shift patterns, seasonal operational changes and local depot routines
- While ICEV telematics can be used to predict the overall quantum of power needed at a site, plug in times cannot always be accurately derived, as vehicles do not plug in immediately on return to depot, for example while unloading of cargo at a different location before parking by the CP. Vehicles that do not need to charge every day can also cause inconsistencies – while, for example, a ‘once in 3 days’ charging pattern can be modelled, drivers may in practice plug the vehicle in more frequently
- While the depots have shown they can respond to flexibility requests, the reliability and duration of their response is mixed. The load at larger depots can be more easily predicted, resulting in better results. The number of EVs sharing each CP also has a significant effect on load predictability
- Depot operators may want to limit demand response offered in order to manage operational risk. While this limits the amount of flexibility available it also has the impact of limiting side effects such as secondary peaks.

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

Work in WS2 is now largely complete. In the next reporting period, the final results will be published in Deliverable D7 and the Close Down Report.

### 2.2.3 WS3 – Mixed trial

The mixed trial, shown in Figure 4, collected anonymised trip data from PHEVs in the London area and analysed this data to forecast future charging demands and network impacts. This trial commenced in August 2020 and finished in June 2022.

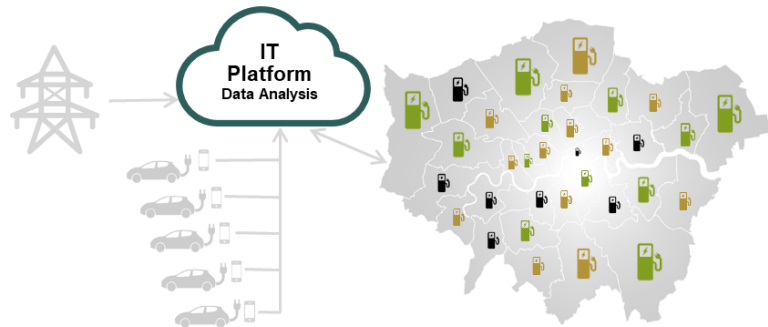


Figure 4 – Schematic of WS3 trial

### 2.2.3.1 Progress in this reporting period

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

- **Technology** – Continued to add additional EV drivers to their platform while capturing anonymised trip data
- **Data** – Provided anonymised EV trip data to Hitachi covering the final months of the period
- **Experiments** – Provided feedback on the results of data analysis, with a focus on how the data is being scaled up to predict the impact of future fleet electrification
- **Behavioural analysis** – Provided input to the review and update of TCO analysis

Outside 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's Uber Green product enables customers in London to specifically request a zero-emissions vehicle.

UK Power Networks has progressed the following activities:

- **Network data provision** – Together with SSEN, provided a final update to the 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
- **Connections surgeries** – Analysed connection requirements for 50 potential EV connection sites for Uber
- **Network modelling** – Worked with Hitachi and supplier Element Energy to input results from analysis of Uber journeys and charging patterns into the SFS.

Hitachi has progressed the following activities:

- **Data** – Captured the final datasets and issued an anonymised deliverable output as part of Deliverable D6
- **Analysis** –
  - Built on methodologies to derive estimated charging patterns from Uber's journey data in order to scale up the data to simulate future demand, improving the method through a number of iterations
  - Carried out analysis of charging behaviour and patterns, and potential impact on the distribution network and reviewed this with Uber and UK Power Networks for publication in Deliverable D7

### 2.2.3.2 *Challenges & lessons learnt*

WS3's data capture proceeded to plan, with the final dataset covering June 2022. As the number of vehicles in the trial has increased beyond the scope envisaged at the start of the project, some revision of models has been necessary to accommodate the larger data sets and changes to the technology platform were required in order to run analysis of the data reliably and in a reasonable timeframe.

A range of lessons have continued to be learnt throughout the WS3 trial of Optimise Prime, and these will be reported in full as part of Deliverable D7. In summary, some key conclusions reached include:

- Demand from charging of Uber PHVs is more spread out throughout the day than in the other trials, with peak demand falling in the evening after 20:00 and continuing into the night
- Battery capacity of EVs is continuing to increase, this is expected to result in demand for charging from PHVs to shift, with less enroute charging required in central areas, as vehicles can complete a full day without recharging
- As the PHV fleet electrifies, the locations where more CPs are needed will change, as the locations of the new EV drivers changes.

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

Work in WS3 is now largely complete. In the next reporting period the final results will be published in Deliverable D7 and the Close Down Report.

## 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 has developed the capability, within their systems, to receive and process profiled connection applications and manage the provision of flexibility services. Additionally, UK Power Networks is utilising the SFS to translate data and learnings from the project to impacts on the distribution network.

### 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 and conducting the first phase of network impact analysis. The main Hitachi activities have included:

- **Data** – Supporting the ongoing process of capturing data from multiple sources for use in analysis
- **Depot flexibility, control and optimisation** – Supporting the implementation of smart charging, flexibility and profiled connections at Royal Mail sites
- **Data science** – Supporting the WS1, 2 and 3 trials through data analysis, including work to analyse the results of the profiled connection and flexibility trials
- **Decommissioning** – Following the end of the trials, work has taken place to decommission operational systems that are no longer needed.



UK Power Networks has:

- Utilised its Active Network Management (ANM) system to set up, dispatch and settle flexibility events and monitor compliance with profiled connections
- Analysed performance of flexibility delivery
- Worked with CK Delta to analyse trials data to generate further insights for DNOs
- Developed systems to receive the very large trial datasets from Hitachi's platform and made the data available on its Open Data Portal
- Worked with Element Energy and Hitachi to run network impact analysis using the SFS, project data and models from their Distribution Future Energy Scenarios to model the potential network impact of fleet electrification and smart charging.

Centrica has operated their charging and flexibility platforms, enacting flexibility events following dispatches from UK Power Networks' ANM system and analysing the results.

#### 2.2.4.2 *Challenges & lessons learnt*

The network impact work has revealed a number of conclusions:

- The electrification of transport could be a significant driver for network reinforcement. The Optimise Prime trials have shown how load forecasting modelling can be improved to be more reflective of the real behaviour of fleet vans and PHVs.
- Time-of-use based smart charging profiles led to the lowest reinforcement costs and volumes for the network overall with the lowest total reinforcement costs, fewest mapped distribution transformer upgrades and lowest demand of fleet vans and PHVs at the time of the peak load of substations. Other smart charging approaches such as flexibility and profiled connections also benefitted the network, however are more challenging to accurately model as the timing of profiles and flexibility events needs to be aligned to local network constraints.

With regard to flexibility, the following general observations have been made, in addition to those reported for WS1 and 2:

- The running of complex trials with multiple variations of flexibility services and smart charging can impact demand forecasting. Care needs to be taken to ensure that trial baselines are not based on periods where other trial interventions are taking place
- Forecasting flexibility turn down for multiple flexibility windows within the same day is complex because each window will affect the delivery during the next window. Focusing on a single period, for up to 1 hour (WS1) and 3 hours (WS2), each day improves the success of turn down.

#### 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 inputs into final deliverables
- Decommission the project systems.

### 2.2.5 **WS5 – Economic Analysis & Business Models**

This workstream is responsible for developing the business case that was put forward in the Full Submission Pro-Forma (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 modelling work considers cost savings, behavioural analysis and improving use of capacity. It also studies the TCO impacts of the project methods and makes recommendations on use of these methods by both vehicle operators and DNOs to reduce the cost and impact of the transition to EVs.

### 2.2.5.1 *Progress during this reporting period*

During this reporting period, this workstream has:

- Updated the analysis of the fleet TCO models to reflect changing market conditions and updated assumptions
- Continued behavioural analysis work, including additional questionnaires with customers of Novuna Vehicle Solutions, capturing the views and attitudes of drivers and fleet managers on the EV transition of their fleets.
- Refined the operating model for the electrification of fleets and made it available as a standalone document
- Worked with Cornwall Insight to compare the different markets where flexible services can be offered

### 2.2.5.2 *Challenges & lessons learnt*

The project has made the following new overarching findings:

- Surveys carried out with a wider group of drivers have confirmed the findings of the fleet questionnaires and show strong support for electrification amongst drivers, although there were some concerns over availability of sufficient charging infrastructure
- Rapid growth in electricity prices, when compared to other fuels, has reduced the operational cost benefits of electrification. Whether adopting EVs is TCO positive still depends on the specifics of each fleet, with the difference between the cost of EV and ICEV still the major cost element.

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

In this final reporting period, WS5 will focus on updating results from the surveys and TCO analysis for publication in Deliverable D7.

## 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.

### 2.2.6.1 *Progress during this reporting period*

During this period, WS6 has compiled and published Deliverable D6, *Datasets* as well as this PPR. All future Optimise Prime deliverables remain on track and their status can be found in Section 6.

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

During the next reporting period, WS6 will publish Deliverable D7, Final Report and the Close Down Report.

## 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
- **Deliverables review** – Reviewing the deliverables of the other project workstreams
- **Communications** – Maintaining the project website, [www.optimise-prime.com](http://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 *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 will publish the final deliverable and close down report.

As the project reaches its conclusion, further knowledge exchange activities will run to ensure the learnings from Optimise Prime are shared throughout the industry.

## 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](#). However, Optimise Prime is continuing to monitor changes within the evolving EV industry.

The Optimise Prime business case will be re-assessed and updated as part of the project’s Close Down Report in early 2023.

## 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. The trial period ended and data collection activity and execution of trial experiments concluded. Data collected during the trials was published as Deliverable D6. Analysis of the data has continued, together with a series of workshops with project partners, including subject matter experts from UK Power Networks and SSEN to draw the conclusions and recommendations that will be shared in Deliverable D7.

Business modelling and behavioural analysis work has also taken place, updating the work shared in Deliverable D5 based the views of additional fleets and taking into account recent changes in the energy market that impact fleet operators’ TCOs.

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

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

Task name	Sub-activities	Status at end of period
<b>WS1 Home trial</b>		
EV and infrastructure rollout	EV deliveries and CP installs	Complete
Formal trials	Carry out analysis and experiments	Complete
Run flexibility trials		Complete
<b>WS2 Depot trial</b>		
Formal trials	Carry out analysis and experiments	Complete
Run flexibility trials		Complete
Depot planning tool	Maintain web-based site planning tool	Complete. Updates made based on feedback and transferred to UK Power Networks
<b>WS3 Mixed trial</b>		
Formal trials	Carry out analysis and experiments	Complete
Data capture and analysis (Mixed trial)	Capture of data from Uber vehicles	Complete
	Analysis of data from Uber vehicles	Complete, findings will be published in <a href="#">Deliverable D7</a>
<b>WS4 IoT Platform, Network Forecasting &amp; Flexibility Analysis</b>		
Analytics platform	Run, test and support	Complete
GSA/SFS Modification	Scope, Implement, Run	Complete, findings will be published in <a href="#">Deliverable D7</a>
<b>WS5 Business Model</b>		
TCO Model	Draft model	Revised model, ready for publication in Deliverable D7
Behavioural analysis	Questionnaires and analysis	Questionnaires carried out and analysed, results published in Deliverable D7
<b>WS6 Reporting &amp; Deliverables</b>		
Deliverable D6	Compile deliverable	Complete, <a href="#">published</a> on 1 November 2022
Deliverable D7	Compile deliverable	In progress, on schedule, due for publication in next period
PPR December 2022	Compile report	Completed and published (this report)
<b>WS7 Project Management &amp; Sharing Learning</b>		
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 5.

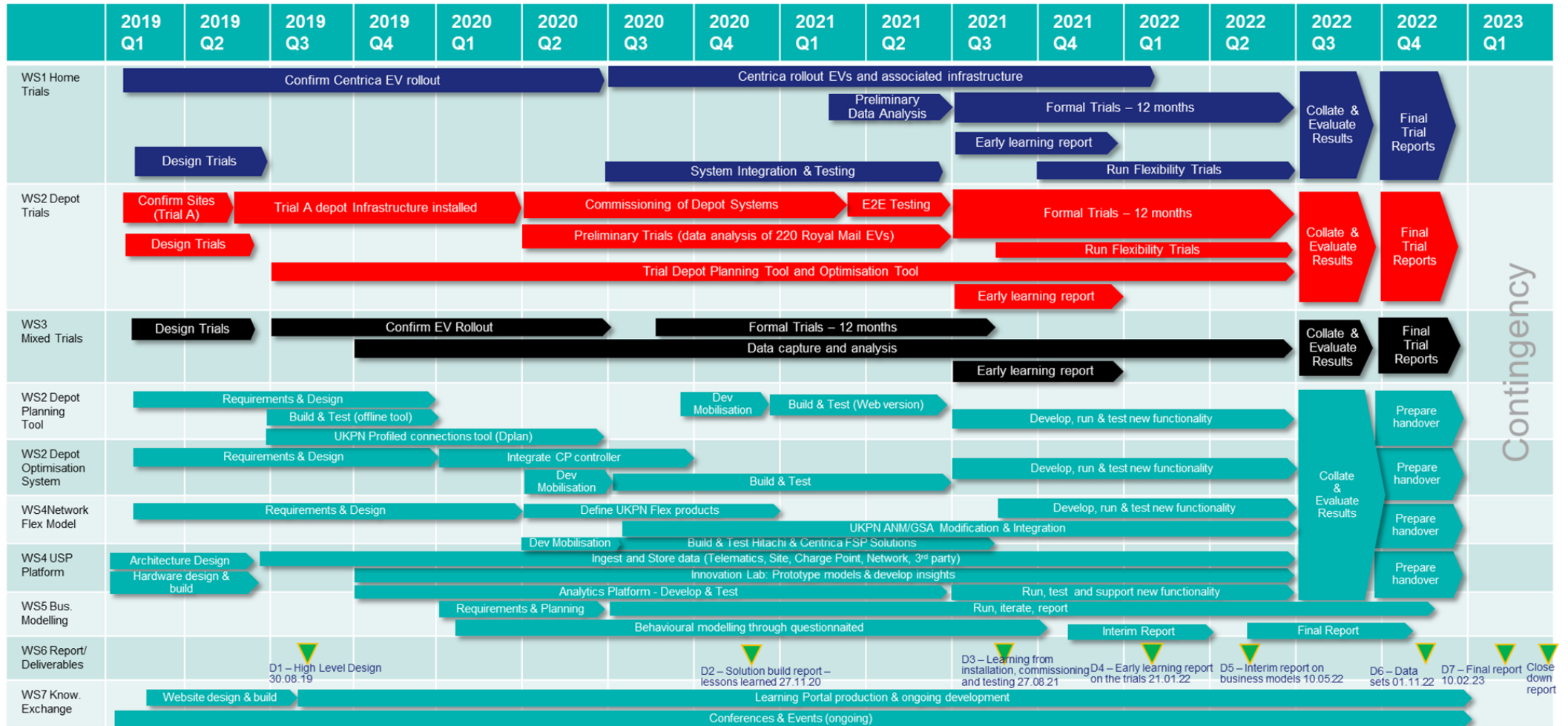


Figure 5 – Summary Project Plan

### 3.3 Identification and management of issues

As the trials are now complete and work has moved to analysis, the project has not encountered any significant issues.

Optimise Prime continues to monitor risks and emerging operational issues through regular reviews. Where necessary mitigations are put in place and lessons learnt are shared through the project deliverables. Section 10 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 2. In summary, the key tasks for the next period are:

- WS1 – Home Trials
  - Publication of results in Deliverable D7.
- WS2 – Depot Trials
  - Publication of results in Deliverable D7.
- WS3 – Mixed Trials
  - Publication of results in Deliverable D7.
- WS4 – IoT Platform, Network Forecasting & Flexibility Analysis
  - Publication of results in Deliverable D7.
  - Decommissioning of remaining project systems.
- WS5 – Economic Analysis & Business Models
  - Publication of results in Deliverable D7.
- WS6 – Reporting & Deliverables
  - Publication of Deliverable D7
  - Completion and Publication of Close Down Report.
- WS7 – Project Management & Sharing Learning
  - Continue to monitor project progress and budgets
  - Continue to update the project website
  - Continue to participate in industry events and share project learnings, including a final project presentation event.

## 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, D2, D3, D4, D5 and D6 have been [published](#). On 20 February 2020, the project notified Ofgem of a non-material change, delaying the publication of deliverables D2-D7 by up to one year. The Due Date column reflects these revised dates. Should it become possible to bring forward the completion of the final 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	<a href="#">Published on time</a> 29 August 2019
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	<a href="#">Published early</a> 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	<a href="#">Published on time</a> 23 August 2021
D4 Early learning report on the trials	Report setting out how each trial is performing, data gathered, insights gained, changes required	18 February 2022	<a href="#">Published early</a> 21 January 2022
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	<a href="#">Published on time</a> 10 May 2022
D6 Data sets	Final datasets gathered from the trials for dissemination to stakeholders.	18 November 2022	<a href="#">Published early</a> 1 November 2022
D7 Final learning report	<p>A report covering:</p> <ul style="list-style-type: none"> <li>• A summary of the work undertaken</li> <li>• The insights gained from the trials</li> <li>• Recommendations and likely costs and benefits</li> <li>• Models for use of commercial EV flexibility by DNOs.</li> <li>• Recommendations on business models</li> <li>• How the trials, the infrastructure and technology should be transitioned after the project has completed and</li> </ul> <p>How to ensure integration of the Methods with DNO/DSO systems and processes</p>	10 February 2023	In preparation



Deliverable	Description	Due Date	Status
Comply with knowledge transfer requirements of the Governance Document	<ol style="list-style-type: none"> <li>1. Annual Project Progress Reports which comply with the requirements of the Governance Document</li> <li>2. Completed Close Down Report which complies with the requirements of the Governance Document</li> </ol> <p>Evidence of attendance and participation in the Annual Conference, as described in the Governance Document</p>	N/A	<p>2019, 2020 and 2021 reports published.</p> <p>This report, together with the June report, will meet the 2022 requirement and a final project progress report will be published in early 2023</p> <p>Preparation of the Close Down Report has begun</p> <p>Members of the project team attended the annual Energy Innovation Summit</p>

## 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, <http://innovation.ukpowernetworks.co.uk/wp-content/uploads/2021/11/UK-Power-Networks-Innovation-Data-Sharing-Policy-.pdf>.

As part of deliverable D6, the project has made 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](http://www.optimise-prime.com), together with the project LinkedIn account <https://www.linkedin.com/company/optimiseprime>, providing periodical updates to interested stakeholders. The project's twitter account [https://twitter.com/optimise\\_prime](https://twitter.com/optimise_prime) is also sharing updates on the progress of the trials.

A number of presentations have been made to conferences organised in-person and online throughout this reporting period. Activities include:

- Stand at the joint UK Power Networks/SSEN [Better Networks Forum](#) on 6 July 2022
- UK Power Networks and Hitachi joined a Cornwall Insight discussion panel on [Battery-as-a-Service](#) on 8 September 2022
- UK Power Networks gave a presentation on Optimise Prime at the [Energy Innovation Summit](#), 28-29 September 2022

- UK Power Networks' Optimise Prime Project Lead joined the Energy Networks Association's [Next for Net Zero podcast](#) to discuss the transition to low carbon transport
- Project members contributed to the BVRLA's [Road to Zero report card 2022](#)
- Two [webinars](#) have been held together with SP Energy Networks' Project Charge on 9 and 23 November 2022
- Hitachi has created and shared a [project newsletter](#) to highlight key project learnings
- The guide to fleet electrification, originally published as part of Deliverable D5, has been made available as a [stand-alone document](#)
- Project data has been made available on the UK Power Networks [Open Data Portal](#) and linked to the [London Datastore](#)
- The project has engaged with London Councils in order to share findings from the mixed charging trials with local government stakeholders
- A series of videos introducing the project and key findings – these can be found at [www.optimise-prime.com/videos](http://www.optimise-prime.com/videos).

Where possible, presentations from 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 (July – December 2022)**

IP Description	Owner(s)	Type	Royalties
Deliverable D6	All project partners	Relevant foreground IPR	N/A

**Table 4 – IP forecast next period (January 2023 – Project Close)**

IP Description	Owner(s)	Type
Deliverable D7	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. As the project draws to a close the level of risks has continued to decrease.

Since June's PPR the project has identified risks R071 to R074. The project continues to monitor risks and issues through regular risk management meetings. Following each meeting risk impacts and mitigation plans are updated. Eleven risks have been closed over this period, due to the risk passing, having been successfully mitigated or having evolved into an issue. 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	<p>Budget completed in 2018 and submitted in the FSP</p> <p>Budget updated in November 2018 for contracts</p> <p>Budget is updated each month for actuals and new forecasts, with a new baseline every quarter.</p> <p>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</p> <p>05/06/20 – Risk of further cost overrun reduced by decision to alter EV targets</p> <p>10/02/21 – Delay in completion of ANM flexibility features may require TOA team to be engaged for longer</p> <p>13/05/21 Exploring options but flexibility trials may involve manual process for products B&amp;C, currently impacting cost.</p> <p>13/10/21 Agreed to manage overspend due to ANM delay by utilising underspend from equipment budget – no impact on overall project budget.</p> <p>07/02/22 – Revised down to medium, reflecting above mitigations, overall underspend and gradually declining risk as project progresses.</p> <p>12/07/22 – Risk profile changed slightly as project nears closure. Main potential for cost over-run will be if project activities beyond forecast end dates.</p> <p>11/08/22 Additional vehicle numbers have meant that analysis period is extended. Still anticipating to come in within budget.</p> <p>07/12/22 Closed – the project forecasts to complete within budget</p>	Medium	Low	Negligible	Open	PM	07/12/22	07/12/22

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	<p>Trials design agreed on 07/06/19.</p> <p>Trial and solution design is clearly defined following set methodology clearly linking activities with outcomes. Designs are agreed with relevant Partners and linked to FSP commitments.</p> <p>Solution design and business case regularly reviewed throughout the project lifecycle and changes are made where needed</p> <p>Review of each Deliverable by UK Power Networks prior to submission to Ofgem to ensure the solution delivers the outcomes</p> <p>25/11/19 – Independent assessor has not raised issues with trials/solution design</p> <p>22/05/20 – Imperial College review supports statistical significance of the trial methods to meet learning objectives</p> <p>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</p> <p>13/05/21 – Looking at benefits management to better measure progress to outcomes</p> <p>13/10/21 – No further updates to note</p> <p>13/01/22 – Profiled connection trials have found that the current form of profiled connections may not be viable at the majority of RMG depots due to the low EV demand relative to variability in background loads.</p> <p>08/02/22 Considering how to redesign profiled connections to give flexibility to customer while still delivering value to DNO, e.g. additional profiled connection products to buy and sell capacity where needed</p> <p>12/07/22 – Beginning the analysis of 10 RMG sites to analyse the benefits of smart charging, etc. with the site planning tool.</p> <p>11/08/22 – 9 sites submitted to UK Power Networks for review following site planning process</p> <p>08/09/22 – Producing new method to assess value of profiled connection in case analysed sites do not require one</p> <p>12/10/22 – Value of profiled connection proven/documented for D7</p> <p>07/12/22 – Risk closed as project findings have been documented and draft recommendations made</p>	Negligible	Low	Negligible	Open	PM	07/12/22	07/12/22
R005	Partner performance is not contractually defined	Outputs delayed or inadequate and potential overspends	<p>Weekly meetings with Project Partners, Suitable incentives where required</p> <p>Shared responsibilities for deliverables</p> <p>Contracts signed on 18/03/19</p> <p>Partners remain committed and performance is tracked by weekly meetings and programme governance</p> <p>- 12/08/20 The delay has resulted in some resource constraints at Centrica for delivering flex trials. Mitigated by rescheduling of trial activity to reduce and batching some trial preparation activity.</p> <p>13/04/2022 – Resource in place from 21 March to work on Centrica Data Science. Probability reduced to low.</p>	Negligible	Low	Medium	Open	PM	07/12/22	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
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	07/12/22	
R016	Major issues with equipment causes damage to network or causes injuries	Equipment is damaged or individual is injured	Analysis of this potential is carried out early in the project and recommendations are incorporated into the design. 22/04/20 – Pilot site in place, insurance in place, no issues to date & minimal risk – change to negligible 08/09/22 – Risk has not changed in profile or controls from last review 12/10/22 – Depot systems are now largely decommissioned, risk extremely low 28/11/22 – All project systems at depots decommissioned – risk closed	High	Negligible	Low	Closed	Trial Operations PM	10/11/22	28/11/22
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. 13/10/21 – Ofgem's minded to decision on the Access and Forward-Looking Charges Significant code review may impact the business case of profiled connections for connecting customers and DNOs. If implemented, this type of flexibility may be more valuable to DNOs but might provide less of an up-front cost reduction for customers. 12/05/22 – Ofgem made final decision on SCR on 3 May 2022, choosing to implement a fully shallow charging boundary 09/06/22 – Since April home charging scheme no longer available for single unit properties, impacting some TCOs.	Negligible	Negligible	Negligible	Open	PM	07/12/22	
R024	Ofgem ability to Halt the Project (Cancellation)	Ofgem may halt the project in certain circumstances e.g. because it has become clear that the Method is not viable or there are other reasons why it is not efficient, or not possible to continue with the project. Ofgem will identify Halted Project Revenues; funds received by Funding Licensee which have not yet been spent (less funds to halt the project).	Critical to keep accurate and up to date records of expenditure and evidence of committed funds. Project is continuously reviewing circumstances, assessing risks and impact, preparing different options and involving Project Board in decision making. Ofgem is notified of changes and consulted where necessary 12/07/22 – Risk remains but becoming increasingly unlikely as project enters final stages 07/12/22 – Closed as trials are complete and final deliverables are being drafted.	High	Negligible	Negligible	Open	PM	07/12/22	07/12/22

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
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	<p>Talking to a number of CPOs as part of new participant discussions.</p> <p>23/06/20 – Discussing potential to test control via back office with CPO providers as alternative method</p> <p>16/11/20 – Awaiting costs and timeframes</p> <p>11/02/21 – Working more closely with CPOs to resolve issues and implement over air functionality.</p> <p>13/04/21 – Trials Operations lead will continue to work with all suppliers etc. to monitor risk level</p> <p>14/09/21 – CPMS provider moved hosting to AWS. Testing appears to have been successful.</p> <p>13/04/22 – Probability remains low as Royal Mail changes delayed and only 3 months of trials remain</p> <p>09/06/22 – Closed as trial nearing completion and changes extremely unlikely</p>	Low	Low	Low	Closed	Design Authority	09/06/22	09/06/22
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.	<p>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</p> <p>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.</p> <p>07/04/20 – Site works suspended. Centrica warn that lead time on vehicles likely to extended and other works delayed.</p> <p>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</p> <p>11/06/20 – Board decision to re-size trials mitigates some risks regarding finding partners, changed probability to low</p> <p>13/10/20 – Risk remains but is low as all partners have or are committed to have vehicles.</p> <p>16/11/20 – Second lockdown started – no major impact yet, continuing to monitor</p> <p>08/12/20 – Lockdown passed with no material impact.</p> <p>07/01/21 – Third lockdown entered. Has resulted in reduction in Uber trips and is likely to have an impact on development efficiency</p> <p>16/03/21 – Uber trips now recovered. Royal Mail Depot questionnaires delayed (see R59)</p> <p>13/04/21 – 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</p> <p>09/07/21 – Sufficient vehicles in place, very few minor risks remain with most mitigated, downgraded to low.</p> <p>13/04/22 – Risk remains, but impacts have been minimal</p>	Negligible	Low	Medium	Open	PM	07/12/22	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
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.	<p>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.</p> <p>16/09/2020 – Static IPs have been established to resolve this issue and prevent reoccurrence.</p> <p>13/04/21 – Continuing to manage relationship with suppliers where required.</p> <p>09/07/21 – Risk will remain throughout project and has not changed in profile.</p> <p>12/11/21 – A platform change by a CSMS provider resulted in a short comms outage due to IP change. VPN is now in place to prevent reoccurrence.</p> <p>13/04/22 – Probability revised to low as trials in final quarter</p> <p>04/07/22 – Closed as formal trials now complete</p>	Low	Medium	Low	Closed	PM	04/07/22	04/07/22
R066	Production of statistically significant data for flexibility trials	The trial partners do not have full agreement on the number of flex events and combinations of parameters needed, creating a risk of not meeting commitments with Ofgem	<p>20/09/21 – A plan for flexibility events throughout the year has been set out and is being exercised for RMG. This covers all required combinations. For Home trials, further revision is ongoing to match effort required to available resources at Centrica.</p> <p>13/10/21 – Possibility of a resource constraint in Centrica and UK Power Networks impacting the number of possible executions, though still on track to deliver statistically significant data at this time</p> <p>12/11/21 – Centrica are experiencing issues controlling CPs for flexibility purposes reliably. Working with CP manufacturer to resolve. Risks delaying flexibility trials with larger numbers of vehicles and may need extra flex periods planned</p> <p>30/11/21 – Centrica are in the process of re-testing flexibility provision with UK Power Networks in order to increase trial sample</p> <p>13/01/22 Centrica successfully ran Product B for 520 vehicles in December, reducing this risk significantly</p> <p>08/02/22 300 vehicles in both product B and C trials.</p> <p>11/03/22 Centrica's flex resource has left project and it is not clear who will run April trials</p> <p>13/04/22 – Resource appointed to coordinate data science/analysis and flexibility process at Centrica</p> <p>12/05/22 – Putting together analysis of statistical significance of the trials</p> <p>07/12/22 – Analysis completed and results being written up</p>	Medium	Low	Medium	Open	Hitachi PM	07/12/22	

ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R068	Centrica resource and technical constraints	As a result of the extended project and other internal resource pressures, Centrica have not been able to be fully engaged in the formal trials and some elements of the flexibility and smart charging solutions have been delayed. Reduced numbers of experiments, simpler experiments, or experiments over a shorter period may weaken the applicability of trial results. Some technical issues in communicating with the ANM system and controlling CPs has also delayed some trial activities and risks further delaying experiments.	Hitachi and UK Power Networks are working closely with Centrica to understand the resource constraints and re-plan flexibility trialling activities accordingly. Where possible, some flexibility tenders are being combined to cover multiple days in one event. Trialling of flexibility services with product B began, utilising the Centrica and ANM systems in October 2021, starting with a smaller subset of vehicles, but with plans to expand the sample. Some control issues were experienced by Centrica, who are working with the CP manufacturer for a resolution and are in the process of carrying out further tests with UK Power Networks. The partners have produced a revised plan of flexibility trial activities. 07/12/21 - Testing between Centrica and UK Power Networks indicates that the problem has been resolved. Centrica are entering 500+ chargers into flexible unit for next flex B run. 07/12/21 – New responsible manager has been appointed for project at Centrica 13/04/22 – Resource appointed to coordinate data science/analysis and flexibility process from 21 March. Probability reduced to low. 12/07/22 – Centrica work on flexibility and load data is progressing, Regular meetings in place with Centrica data and fleet contacts. 08/09/22 – Closed - Majority of required work complete	Medium	Low	Medium	Closed	Hitachi PM	08/09/22	08/09/22
R069	Royal Mail BAU electrification may impact trial conditions	Royal Mail is expanding their EV fleet. Addition of new vehicles and/or new charging infrastructure alongside trial systems may impact predictability of loads on sites. Royal Mail plan to migrate some legacy CPs.	Move to new provider before end of March may lose 18 sockets at three sites. Reconfiguration needed at further 30 sockets which may result in temporary disruption. Before Christmas additional 10 at Dartford and Victoria, six at Bexleyheath and Orpington, five at Whitechapel. Originally temporary but may be staying permanently and registering as either background load or other vehicles. Discussing impacts with Royal Mail. 08/02/22 – Transition date not known. Discussing how to manage impact of new infrastructure with depot managers. 11/03/22 – Adding 37 new vehicles into project data as they are becoming permanent and agreed not to migrate CPs until after 1 July 2022 revised to low probability 04/07/22 – Closing risk as official trials have now concluded	Medium	Low	Medium	Closed	Hitachi PM	04/07/22	04/07/22
R070	Delays in/failure to approve release of data may delay academic analysis and/or D6	Partners must approve data sets for release for Academic analysis tender (and later D6). Cannot proceed if data release is not approved.	11/03/22 – Royal Mail have approved release 13/04/22 – Approval received from all three fleets for data for tender and for RMG/Centrica data for D6. Uber data for D6 still needs to specified and approved but given good progress probability set to low. 12/07/22 – Uber dataset for D6 is being created and discussed with Uber in order to meet contractual obligations. 11/08/22 – Uber has agreed example dataset for D6 08/09/22 – D6 with partners for comment 12/10/22 – Closed as D6 data approved	Negligible	Low	Medium	Closed	Hitachi PM	12/10/22	12/10/22



ID	Name	Risk Description	Mitigation/Comments	Impact on Cost	Probability	Impact on Schedule	Status	Owner	Last Review	Closure
R071	Volume of data in WS3 delays analysis and forecasting	The volume of EVs in WS3 has exceeded expectations (6k+ vs 1k target). The models created to analyse the resultant data struggle with this volume, require a significant amount of compute resource and sometimes fail.	12/07/22 – In order to run the analysis, the journeys are being broken down into smaller batches. This allows them to run without failure, but still takes time. To mitigate this further, it is proposed that the data science environment is rearchitected to use Azure Machine Learning in place of Jupyter server, providing greater capacity and the code is being reviewed to improve process efficiency. 11/08/22 – Closed – Azure machine learning implemented successfully. Replanned activities to cover delays	Low	Medium	Medium	Closed	Hitachi PM	11/08/22	11/08/22
R072	Network modelling work not complete for D7 drafts	The Strategic Forecasting System and external data analysis work has a very tight deadline to get content into the initial drafts of D7 in time for reviews.	11/08/22 – Both workstreams report as on schedule. Planning to delay the completion deadlines for D7, which should provide a larger time buffer between this work completing and finalisation of D7. 08/09/22 – Some slippage, but mitigated by changes to plan 12/10/22 – Completion has slipped further, but sufficient time remains in plan 07/12/22 – Final draft received. Risk will close when integration with D7 is complete	Negligible	High	Medium	Open	Hitachi PM	07/12/22	
R073	Partner industrial action	Industrial action taking place at partner company may impact staff available for review and feedback	12/10/22 – Documents for Review will be shared as soon as possible to give as much time as possible for review. 07/12/22 – Drafts of final deliverables shared with all partners	Negligible	High	Low	Open	Hitachi PM	07/12/22	
R074	Delays to implementation of comms changes at depots	Partner contractors need to arrange alternative comms route to CPs at final depot before project systems can be switched off	12/10/22 – Only one depot remains with comms through project systems as cellular comms not possible. Survey has taken place and solution identified. Awaiting agreement and install. Escalating to ensure this is completed. 15/11/22 – PO issued for work, awaiting install date. 28/11/22 – CPs reverted to 'plug and charge' and no longer reliant on project systems to operate. Risk closed	Negligible	High	Negligible	Closed	Hitachi PM	10/10/22	28/11/22

## 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 the six months 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 & IS

Date 19 December 2022