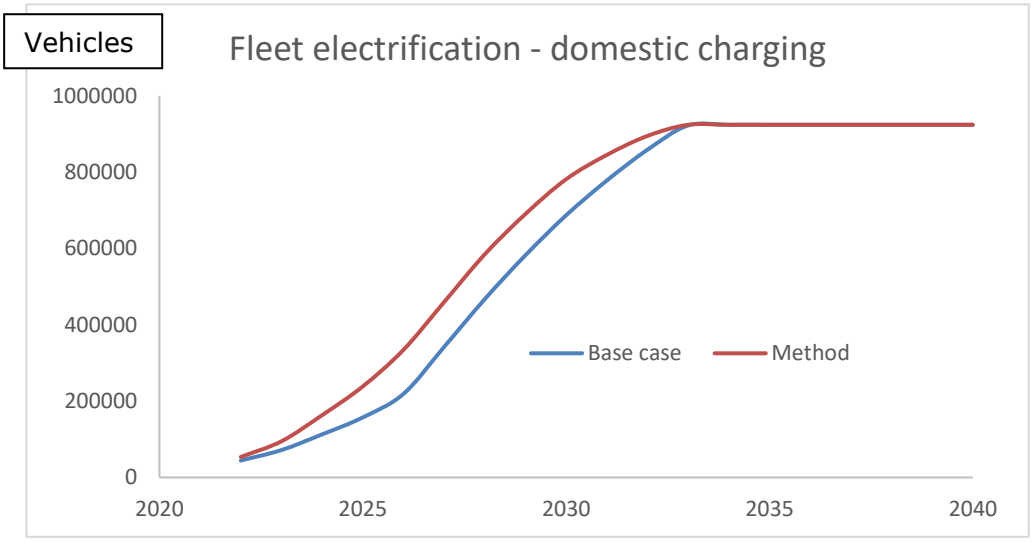
Electricity Network Innovation Competition Full Submission

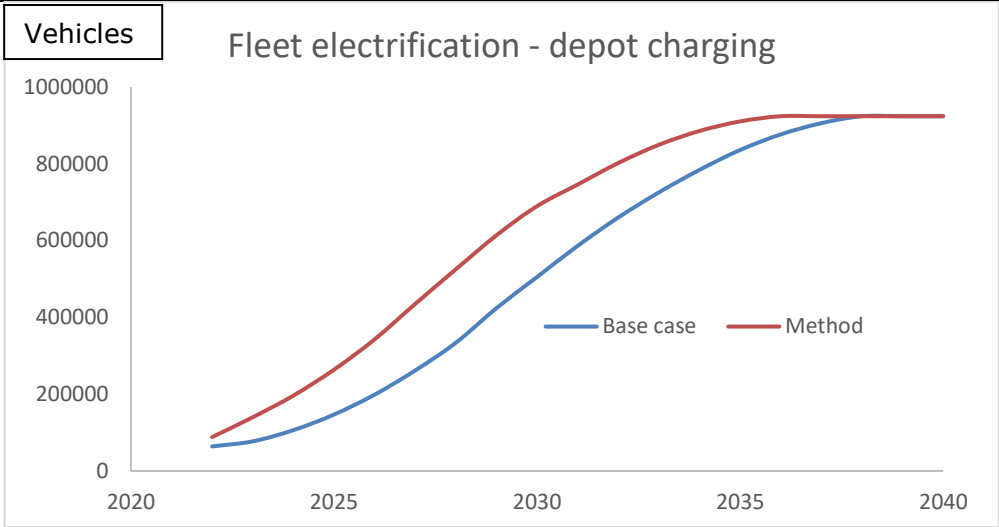
Supplementary Answer Form

Project: Optimise Prime

Tick if this answer has been provided verbally: ☐

Project code	UKPNEN03	Question Number	26
Question date	20/09/18	Answer date	24/09/18
Submission section question relates to	3.2 Links to business changes within UK Power Networks and GB DNOs		
Topic	(a.i) the analysis of the cost, time to implement and level of network capacity that a project could provide, including scrutiny of all assumptions (if this measure is appropriate to the project)		
Question	Can you please provide a copy of the report for the NIA Recharge the Future project used for the EV uptake estimates and can you please provide the data used regarding the uptake rate of commercial EVs and the percentage availability for flexibility for Method 2. What are the assumptions in the load and network impact calculations for: 1. The size (unconstrained) of the Depot demand (per Depot, for the UKPN area and for GB) 2. The ratio of EV to non-EV (peak) demand for a depot. 3. What are your assumptions regarding the time the vehicles will be in the deport, e.g. using the 12 hour availability apparently used, is this all assumed to be available between 20:00 and 08:30 or is there a spread?		
Notes on question	We believe that this also relates to section 10.3 in the Appendix.		

Answer	**Recharge the Future:** We are still working on the report for Recharge the Future as the project is still in progress. We are happy to share it once it is ready. It should be noted that the EV uptake forecasts from Recharge the Future were an input to our load growth model used for our Planning Load Estimates. Recharge the Future does not consider commercial EVs, due to lack of data, so the additional load from commercial fleets was assessed based on the uptake and assumptions described below. The load growth model outputs, which take into account the Recharge the Future EV uptake for private cars, has been used for both the Base and Method cases. **Commercial EV uptakes:** The uptake rate assumptions were made based on market intelligence and partner experience. For example, fleets will transition 20% of their vehicle renewals at total cost of ownership parity. The uptake assumptions are detailed in Table 16 and Table 17 for domestic fleets and depot-based fleet, respectively. Specifically, the uptake rate in percentage is shown in Figure 23 in Appendix 10.3. The graphs below show the same uptake rate in absolute numbers. This is scaled up based on the company registered light good vehicles (LGVs) as explained in the answer to Q23. Note that only commercial electric vehicles were included in the uptake as these are the only vehicles being trialed. 



Flexibility for Method 2:

Flexibility assumptions for Method 2 are recorded in Table 19 in Appendix 10.3. In general, 15% of the fleet was assumed to be inflexible due to operational constraints (this is in line with our partner's, British Gas, employee operational schedule). This is a conservative estimate for flexibility availability before 100% electrification because the remaining diesel vehicles could be used by standby personnel to maximise the flexibility of the electric vans. From the 85% of available for flexibility vehicles, we assumed that only a percentage of them would engage in demand response activities to ensure that our benefits were not overstated. One of the fundamental outputs of Optimise Prime is understanding the appetite from fleet operators to engage in flexibility activities.

Moreover, it was assumed that only the depots on 24/7 firm connections could provide flexibility services, and flexibility services are only required when there are constraints on the distribution network.

Load and network impact assumptions:

1. We have not used the demand for the existing depots (the demand would largely vary depending on the size and use of each depot and we have not yet selected the depots for the trial). This was not used in the calculations as they are under existing connection agreements just like any other load connected to our networks. However, we used our load forecasts for the substations the depots connect to as the base load on our networks (which included the existing depot load) – both for the Base Case and Method 2. The commercial EV load was then applied on top of the existing load as these were not included in the forecast model. The network impact was calculated based on the depot-based EV uptake and load assumptions stated in Table 19 in Appendix 10.3.
2. We have not used the demand for the existing depots. The commercial EV load at the depot has various network impacts depending on the headroom available and other non-commercial EV load growth at the connected substation. In general, reinforcement could be deferred or even completely avoided with flexibility when the EV load is a large percentage of the overall load (high impact). In the list of depot sites provided by the partner, a mix of low and high impact sites were selected to give a more representative picture as

	detailed in Table 15 in Appendix 10.3.1.2. This applies to both Method 1 and Method 2. 3. Our assumption is there is a spread of availability. The delivery fleets will be at the depots from 14:00 to 08:30 and the collection fleets will be at the depots from 20:00 to 12:00. However, considering the period that all vehicles are at the depots, which is 20:00 to 08:30 (12.5 hours), there are enough hours for flexibility as the current battery size would only take 3-4 hours to charge fully as described in Table 19. This is consistent with early information from WPD's Electric Nation project on smart charging where they indicate that most people only charge for a quarter of the time they are plugged in. Assuming commercial vehicles need half of the time due to higher mileage, a 12.5 hour window is still more than adequate.
Attachments	