Transport

Energy Infrastructure

Knowledge & Enterprise

project sciurus

cenex

Sciurus: Key Findings From Final Insights Report

Greg Payne

Modelling & Simulation Lead

About Us

Independent

Not-for-profit

Experts

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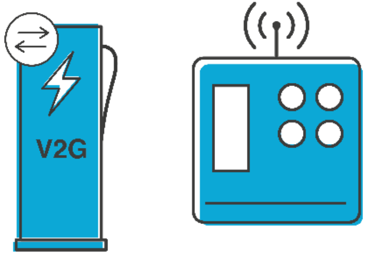
Introduction to Analysis

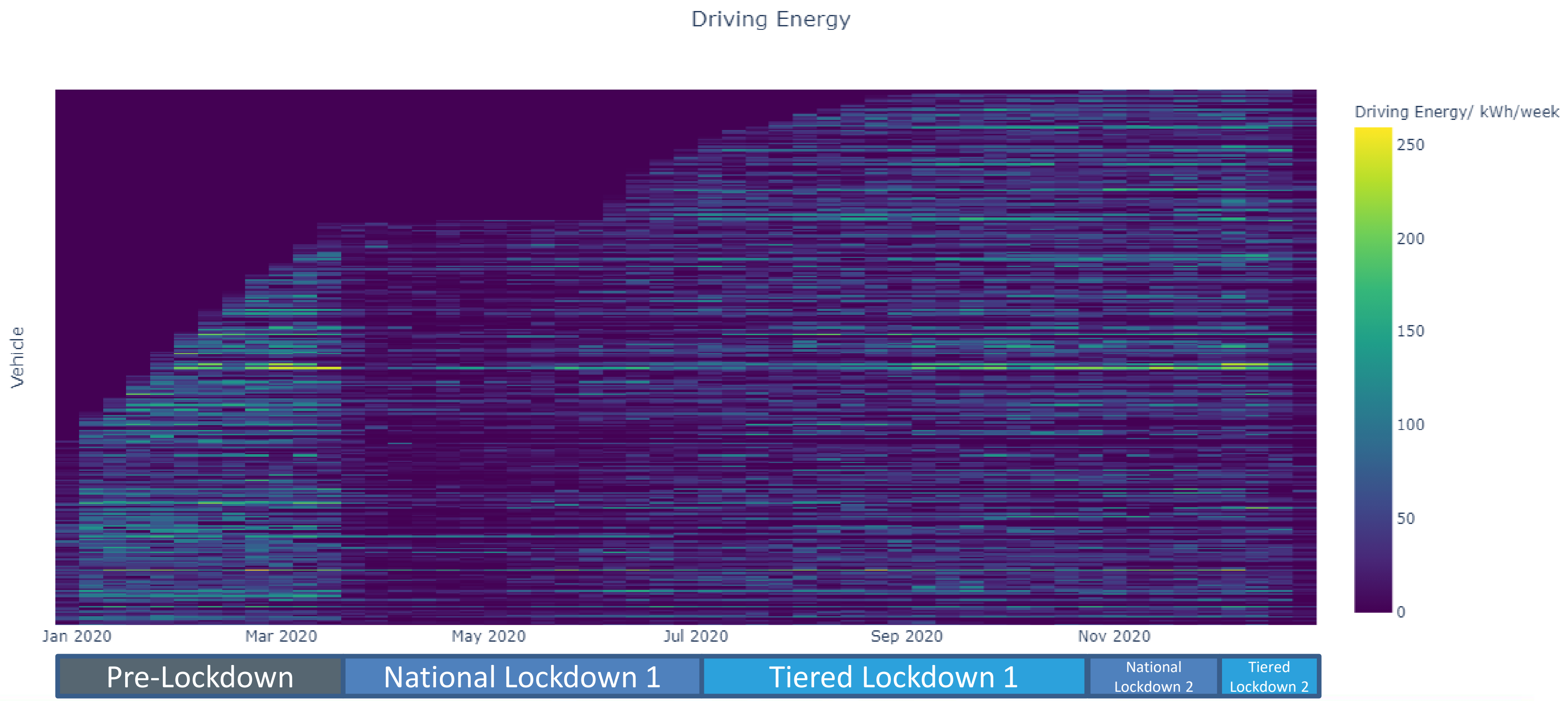
Data from each V2G unit on the trial has been collected and analysed.

Results from an online survey of participants was incorporated.

Data collected was run in our in-house model.

The importance of V2G customer archetypes was assessed.




Driving Energy
Vehicle
Driving Energy/ kWh/week
250
200
150
100
50
0
Jan 2020
Mar 2020
May 2020
Jul 2020
Sep 2020
Nov 2020
Pre-Lockdown
National Lockdown 1
Tiered Lockdown 1
National Lockdown 2
Tiered Lockdown 2

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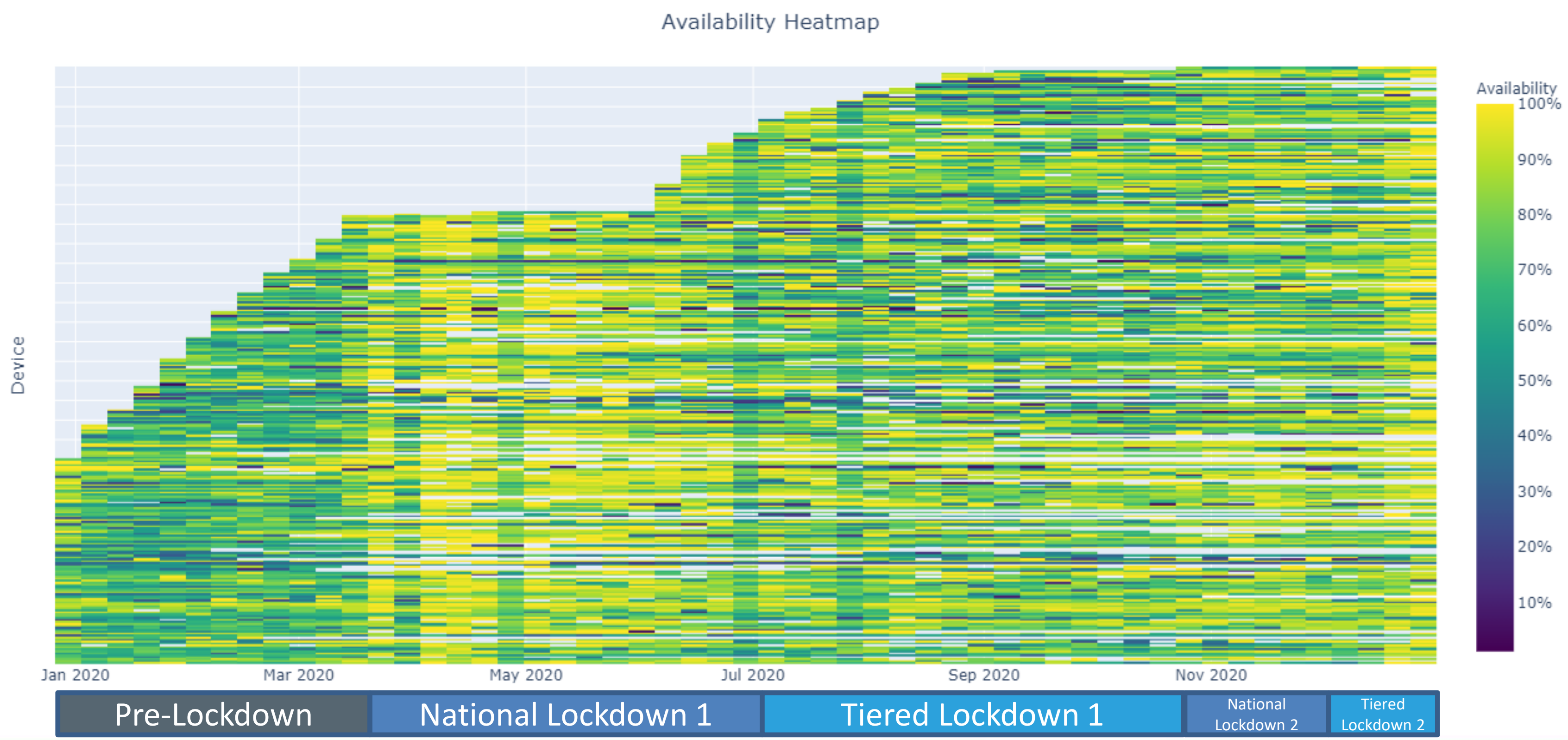

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Plug-in Availability During Trial

Typical Domestic EV Plug-in Availability:

30%-40%

Trial Plug-in Availability:

56%

Lockdown Plug-in Availability:

70%

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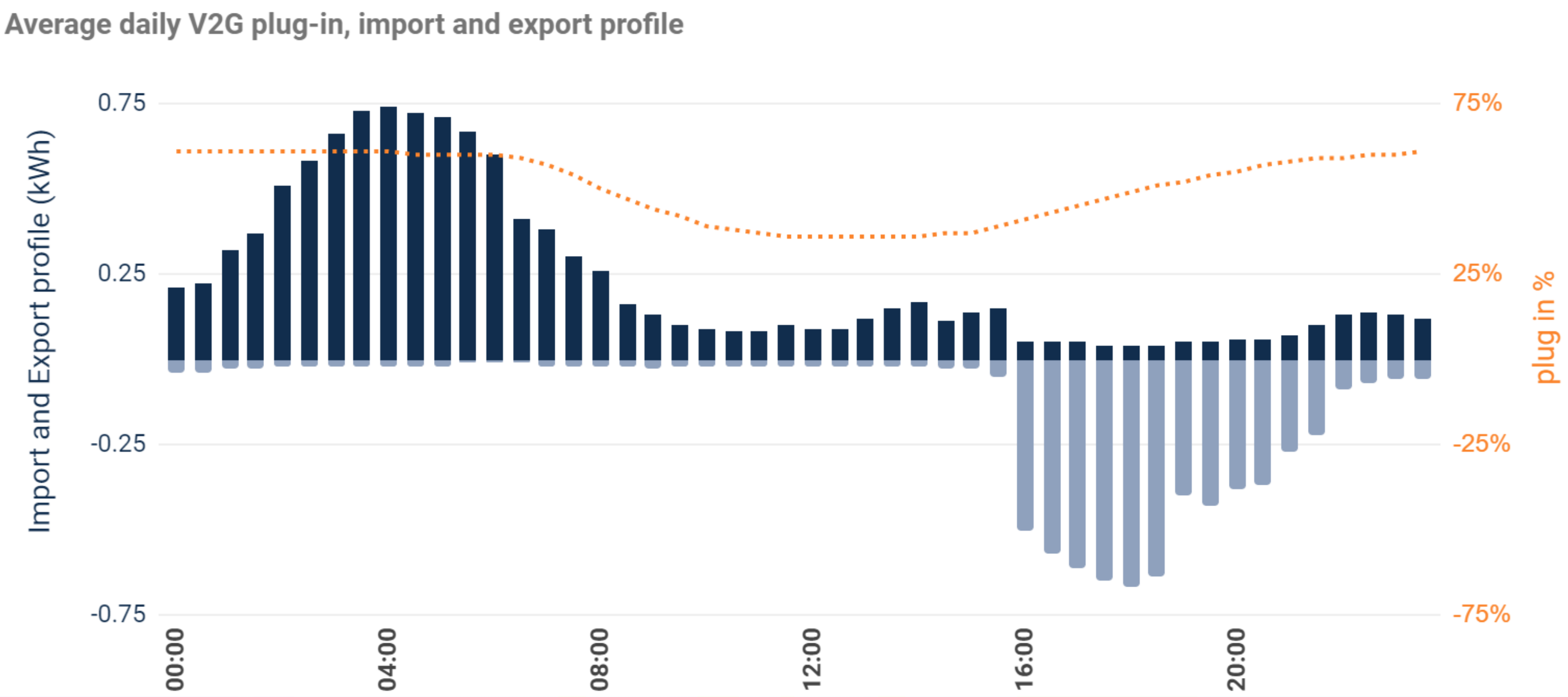
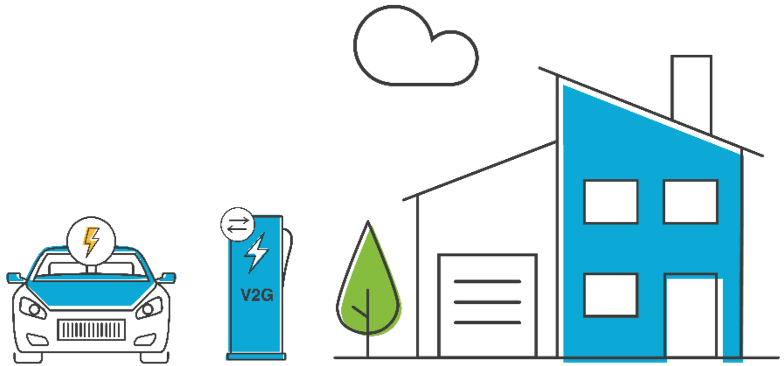
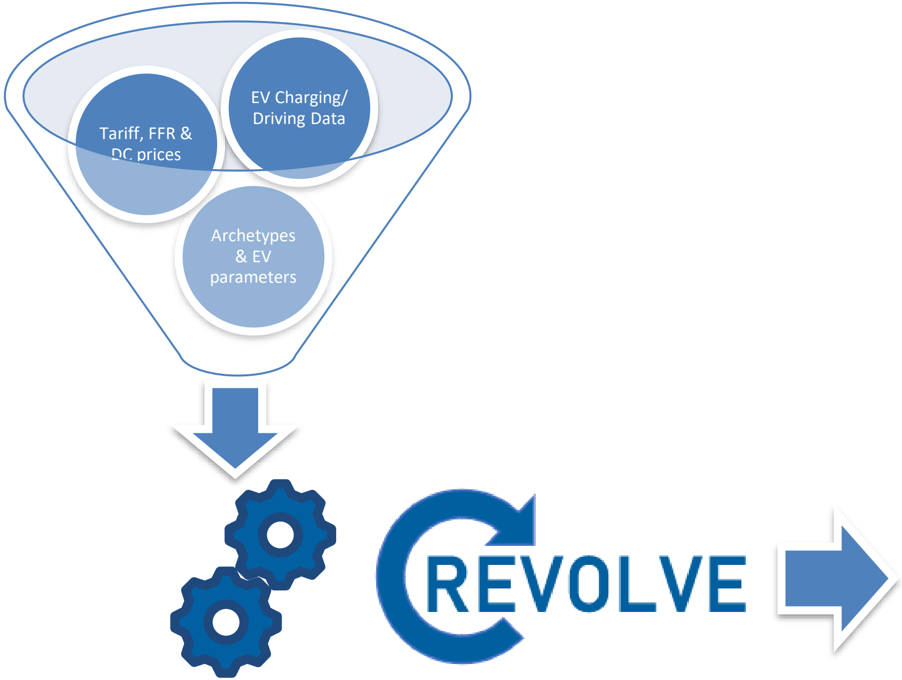
Actual Plug-in and Energy Profile



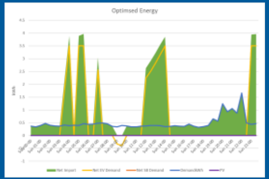
Modelling from Trial Data

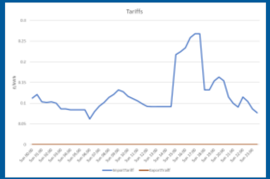


Modelling Approach

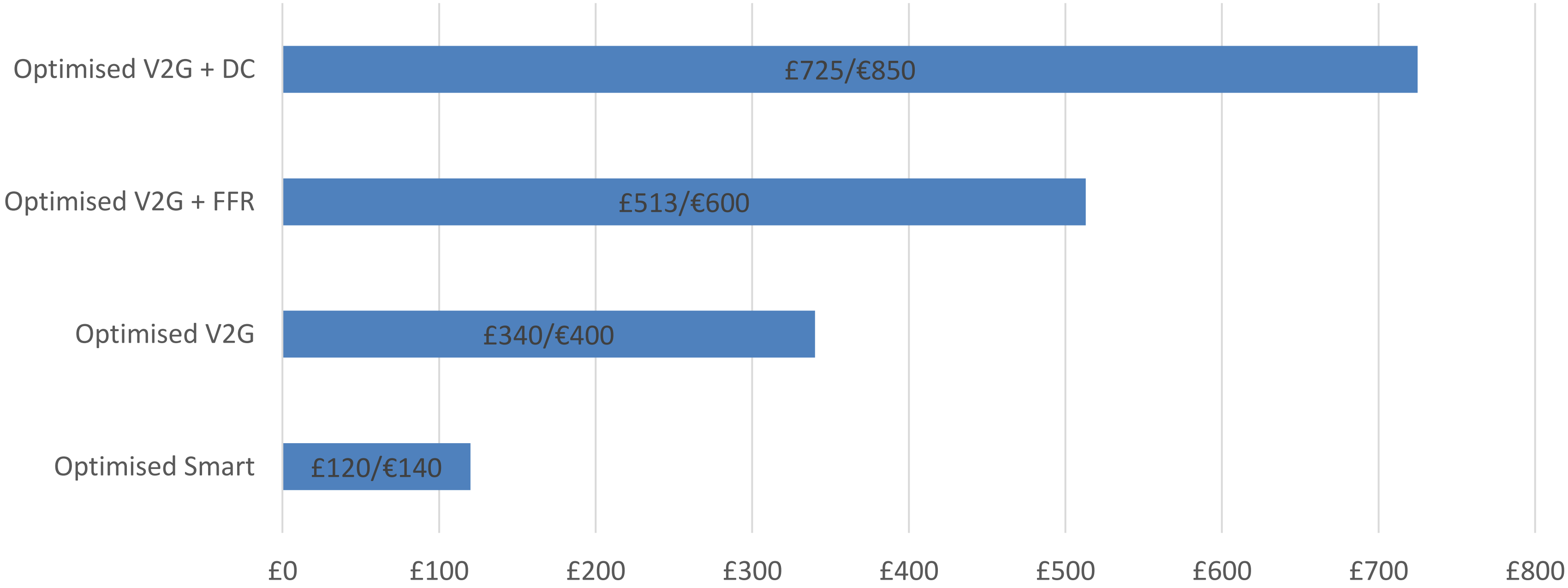


Optimised Charging Schedules & Grid Service Participation





Annual Per Chargepoint Revenue



Note: Against a HH settled unmanaged charging baseline

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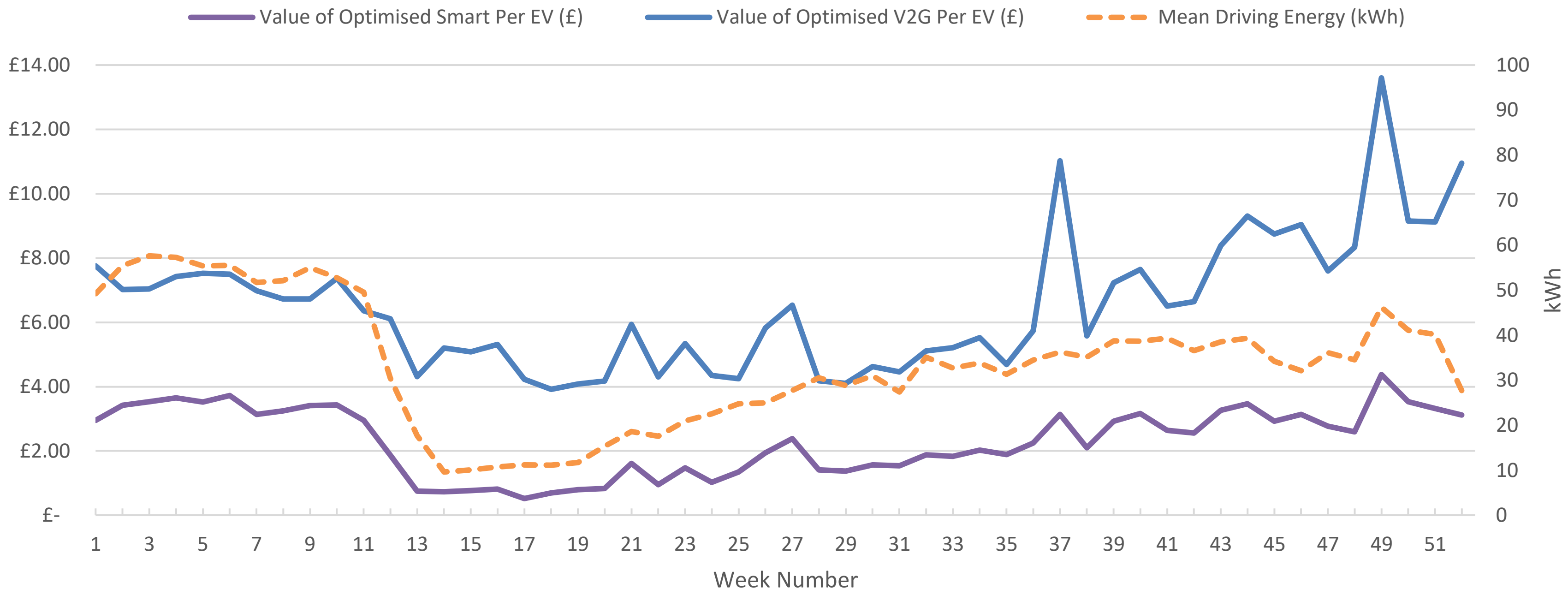
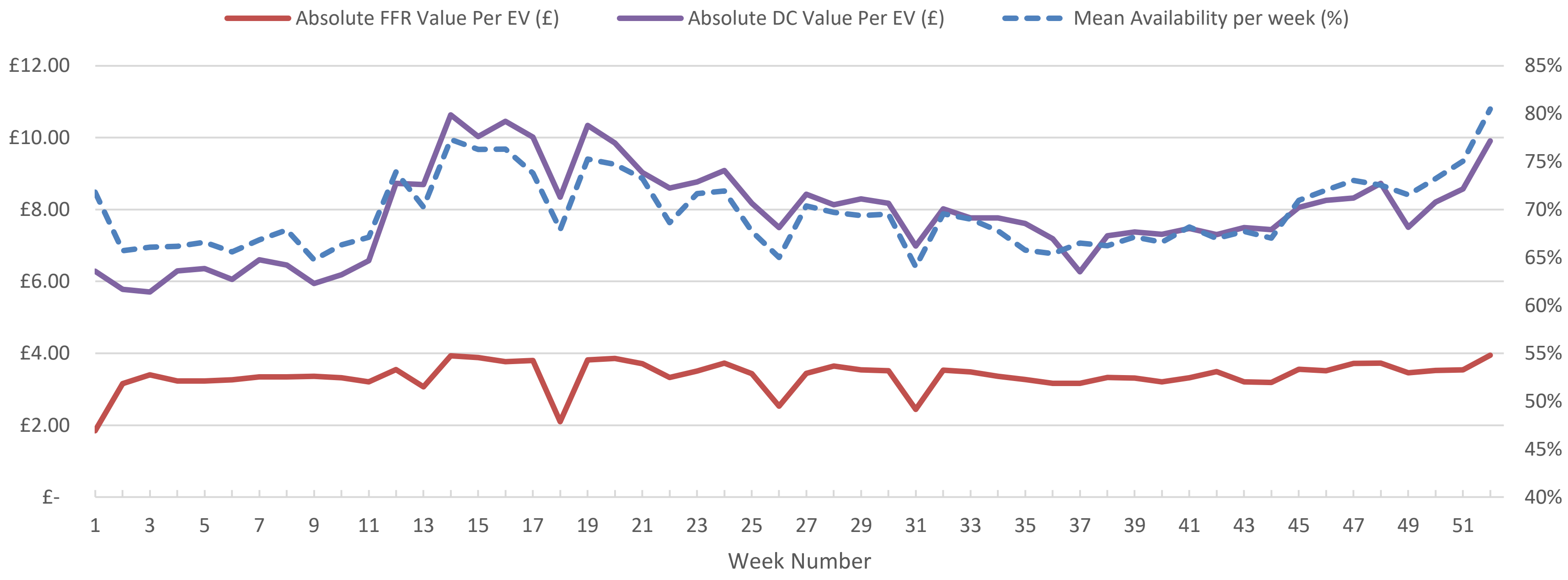
Weekly Value of Optimisation During 2020



Note: Spot market price spikes occurred in weeks 10, 37 and 49

Weekly Value of Grid Services During 2020



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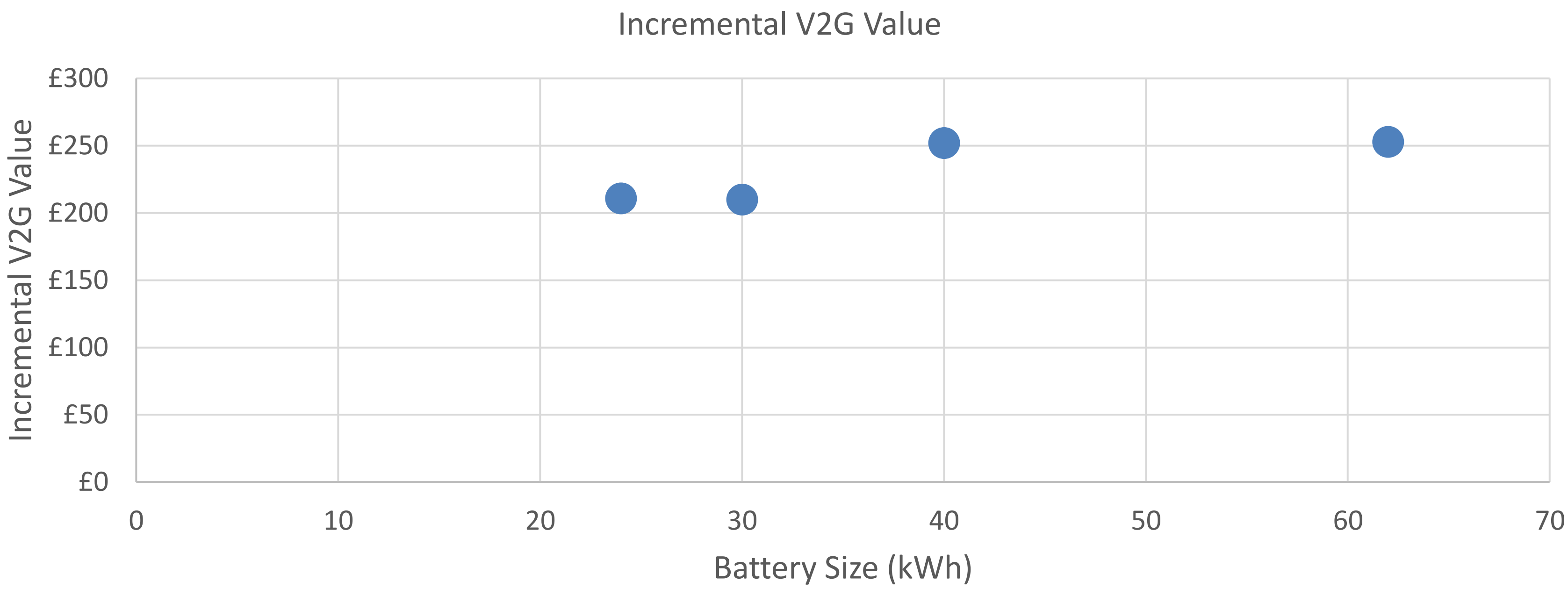
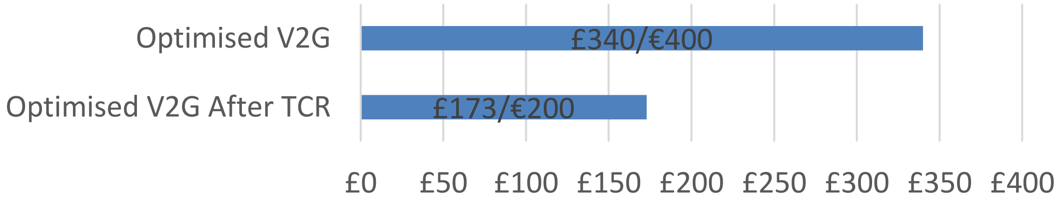
Does Size Matter?



Note: Incremental V2G value is the value of the V2G optimisation above the Smart optimisation

Future Changes To Revenue (UK, Policy)

- Targeted Charging Review will remove time of use based TNUoS charges in April 2022
- DUoS export rates for domestic premises will become shaped from April 2021
- The Net Impact: ~ 50% reduction in tariff optimisation income for V2G



- However, emerging balancing services (e.g. DC), and wider access to the Balancing Mechanism could form additional income.

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High Level Business Case

	Simple Payback Period (years)		
REVENUE OPTION	Current V2G Hardware Cost	Incremental V2G Hardware Cost at £1,000	Incremental V2G Hardware Cost at £1,000 & Without TCR
Optimised V2G	>30	11	5
Optimised V2G + FFR	15	4	3
Optimised V2G + DC	8	2	2

£1,000 ~ €1,175

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Domestic V2G Archetypes

Cenex previously produced a portfolio of V2G customer archetypes.

See our public report “Understanding the True Value of V2G” 2019.

First Generation EV Owner

This is someone in their 50’s or 60’s who is an early adopter of technology. They already have PV on their home, and now an off-street V2G charger. They are very energy conscious and would like to maximise battery life. The car is an early EV, used for commuting in the day but spends most of the rest of the time plugged in at home.

Technology Progression

2020	2030	2040

BEV
PHEV
N/A

Key Information:

V2G Location:	**Home**
No. of EVs using charge point:	**1**
V2G Availability:	**40-60%**
Potential no. in the UK:	**1k-10k**

Primary User		Usage	
Age Range:	40-60	Parking Pattern:	Predictable
Income Bracket:	Varied	Type of trips:	Short/Medium
Employment Status:	Employed	%age of plugged-in time used for charging:	20-40%
Vehicle Ownership Type:	Owned		
Battery Life Conservation:	High	Charging Location:	Mostly at this location
Primary Motivation:	Environmental	**Location**	
Vehicle		Building ownership type:	Owner
Battery Size:	Small	On-site renewables:	Yes
Type of vehicle:	Midsize car	Parking Location:	Varied

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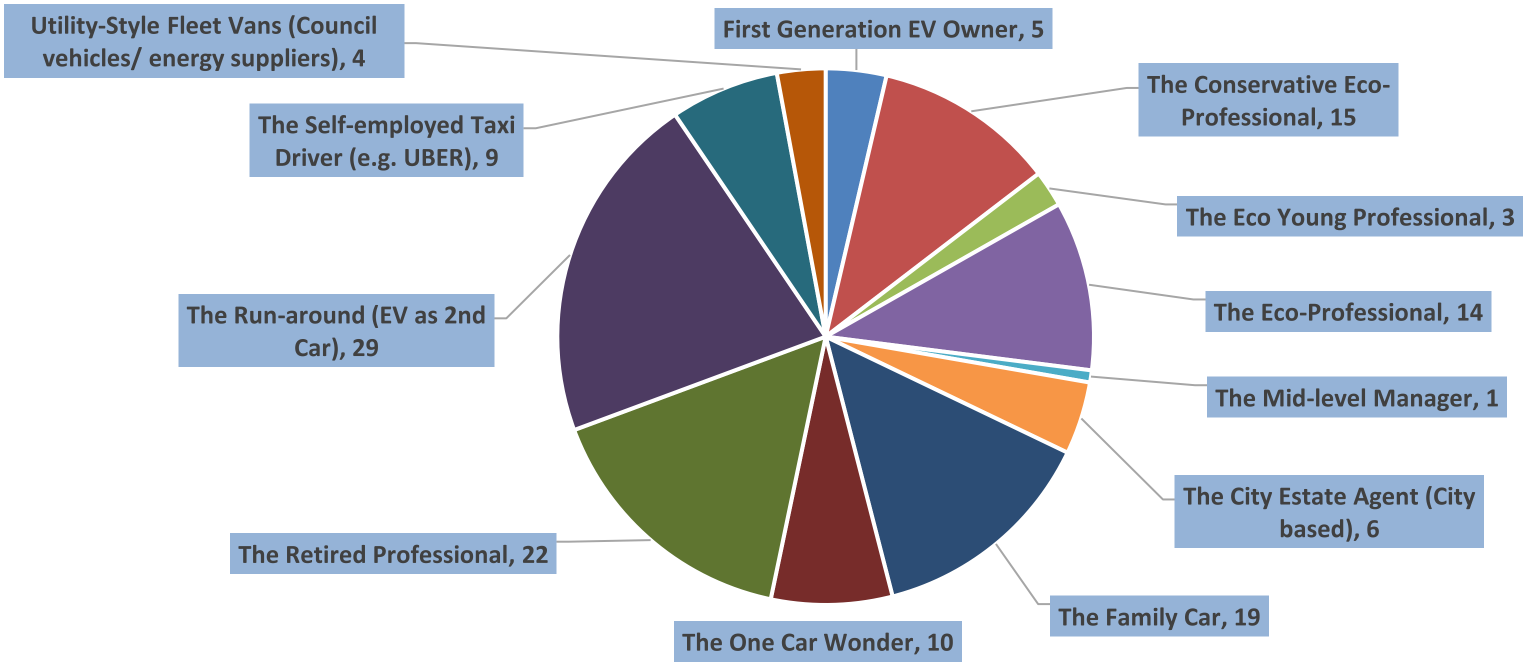
Archetypes of Survey Respondents



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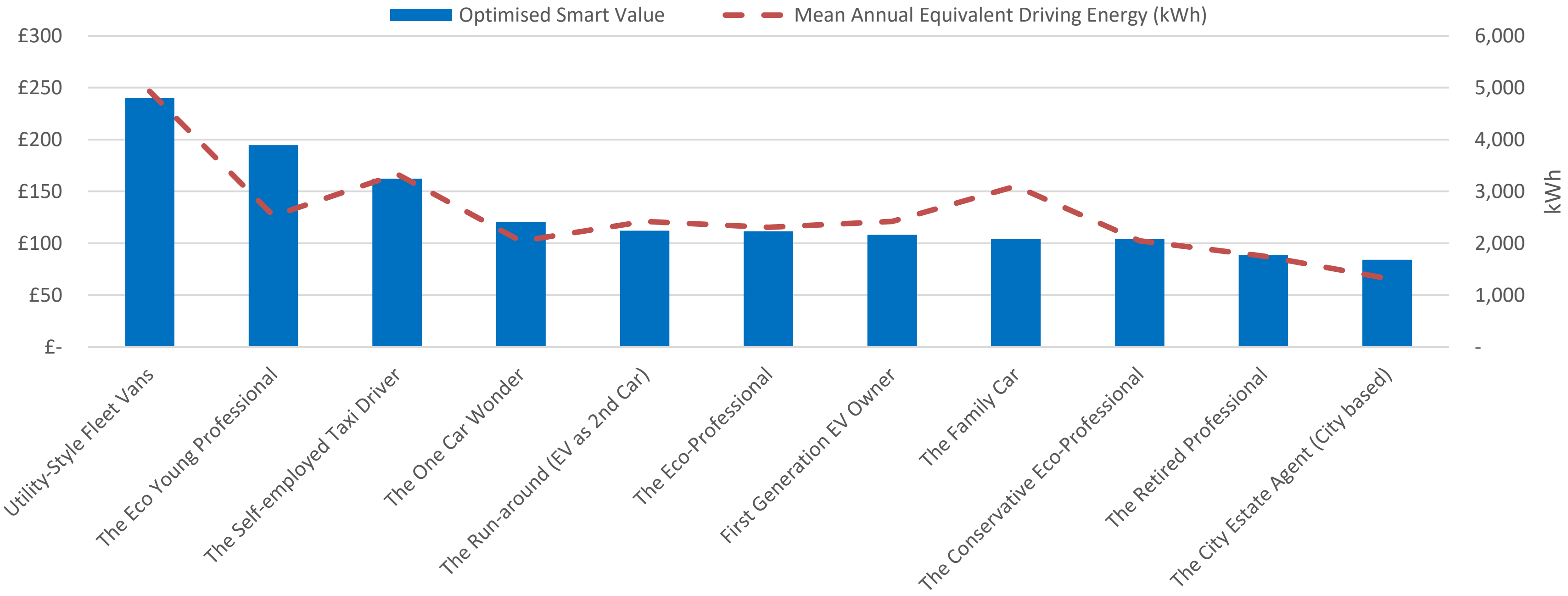
Value of Archetype for Smart Charging



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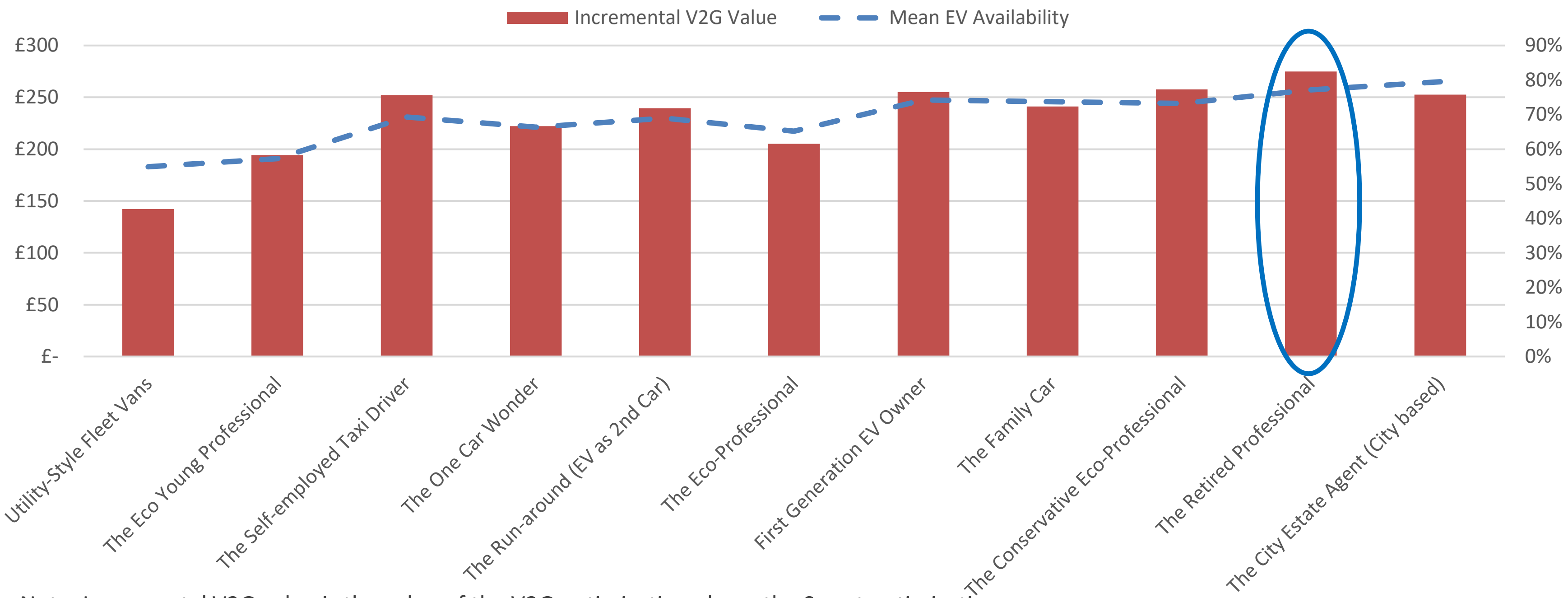
Value of Archetypes for V2G



Note: Incremental V2G value is the value of the V2G optimisation above the Smart optimisation

Conclusions

- With incentives, V2G EV drivers do plug in significantly more.
- Experience of the technology alleviated most concerns from the participants.
- Not all residential customers are equal, the right archetype improves the business case.

Recommendations

- Value from flexibility can fluctuate significantly. Consequently, value propositions should seek to be able to switch between several revenues streams in order to mitigate risk.
- Being able to stack revenue streams is important:
  - More granular tariffs with greater volatility help V2G
  - Optimisation should be able to capitalise on wholesale price spikes
  - Providing grid services in addition to arbitrage
- Initial financial cost to customers should be reduced, either via hardware cost reductions, or a revised proposition.
- EV with batteries of 40 kWh and above should be targeted in preference to smaller batteries.

Further Information

- Commercial Viability of V2G –*Project Sciurus White Paper*
- Sciurus Trial Insights - *Report*
- A Fresh Look at V2G Value Propositions - *Report*
- Understanding The True Value of V2G - *Report*

All available for free.

Search ‘V2G’ on the Cenex website: https://www.cenex.co.uk/?s=V2G

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Thank you for listening

Greg Payne

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