



Electric Vehicle Pilot

Insights & Learnings from our Electric Vehicle Pilot
Broome and Esperance

1 December 2020

Acknowledgement of Country

We respectfully acknowledge the original custodians of the lands and extend that respect to all First Nations people across our service area.



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This report summarises key information and learnings obtained from the EV Pilot. Data referenced in this document was acquired from the following sources: *Chargefox (for public charging data), the '2020 Question' microsite, and voice of the customer surveys from those having participated in the Pilot.*

Introduction and pilot objectives

The Electric Vehicle (EV) Pilot is a strategic initiative by Horizon Power. Our goal is to prepare for and support the uptake of EVs and hydrogen vehicles, advancing our understanding of the emerging opportunities and challenges to achieve emission reduction goals.

1

Customer experience and convenience

We're studying how our customers interact with EVs, their charging preferences, and overall experiences.

2

Our preparation for EVs

We're demonstrating to our stakeholders that we're actively preparing for the increase in EV usage.

3

Use of pricing signals

We're researching how pricing signals can influence our customers' charging times to help reduce peak demand placing burdens on the electricity networks.

4

Impact on our microgrids

We're assessing the potential impact of EV charging infrastructure on our microgrids. This will help us understand the network augmentation required to maintain grid reliability and stability as more renewables generation is introduced and EV uptake increases.

Market Overview

1

Exponential growth in EV sales

Australia and Western Australia have experienced substantial growth in EV sales.

Despite the lack of national coordination and support, electric vehicle sales tripled from 2,216 to 6,718 in 2019¹.

2

Low adoption of EVs In Australia

When compared to developing countries where EVs account for 2.5% to 5% of all new vehicles sold.

Australia lags behind with EVs making up only 0.6% of all new sales. This demonstrates significant potential for market growth.

3

Low penetration of EVs in WA

In Western Australia, as of 30 September 2020, there were 1,325 electric vehicles or plug-in hybrid electric vehicles categorised as light vehicles.³

Of these, 340 were owned by businesses and 1,040 were for personal use.

4

Rapid EV quarterly growth in WA

The ownership of EVs grew 17.45% in Q3 2020, increasing from 1,175 at the end of Q2. During the quarter, a total of 205 new EVs were registered.

In WA, Tesla makes up 40% of combined BEV & PHEV sales, Hyundai 16%, Mitsubishi 14%, and Nissan 14%. A further 16% is made up of eight other carmakers.⁴

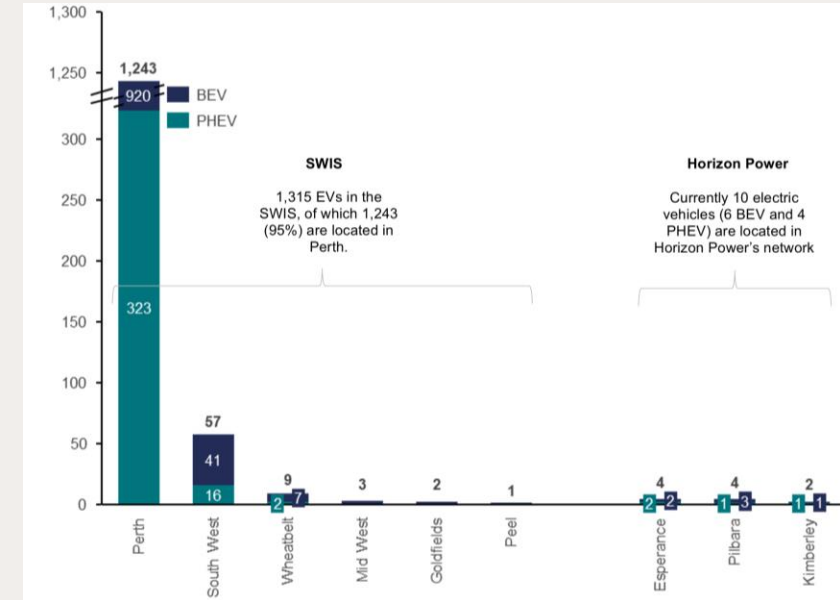


Figure 1: Number of electric vehicles in WA, by region

1. S. Bridie (2020) 'How many electric cars are there in Australia, and where are they?', The Driven, 23 December 2020
2. Electric Vehicle Council (2020) 'State of Electric Vehicles Report 2020'.
3. WA Department of Transport
4. WA Department of transport

Pilot Project Scope

The Hyundai Kona 64kWh



- 100% electric
 - 449km of range
 - 64kWh battery pack
 - 0-100km/h 7.6sec
- Deployed at Broome and Esperance as a fleet vehicle.

The charging stations



- 22kW AC fast charger
- Deployed at Broome and Esperance depots
- Deployed at Broome Visitors centre
- Will charge 120km per hour



- 7kW AC fast charger at each participant home
- Will charge 50km per hour

The pilot program was run for 12 months in Broome and Esperance.

Participants were selected in both Horizon Power depot locations based on the differences we expected to see in charging behaviour and interactions with the EV (Family of four vs Empty nester)

The 2020 Question – Customer Campaign

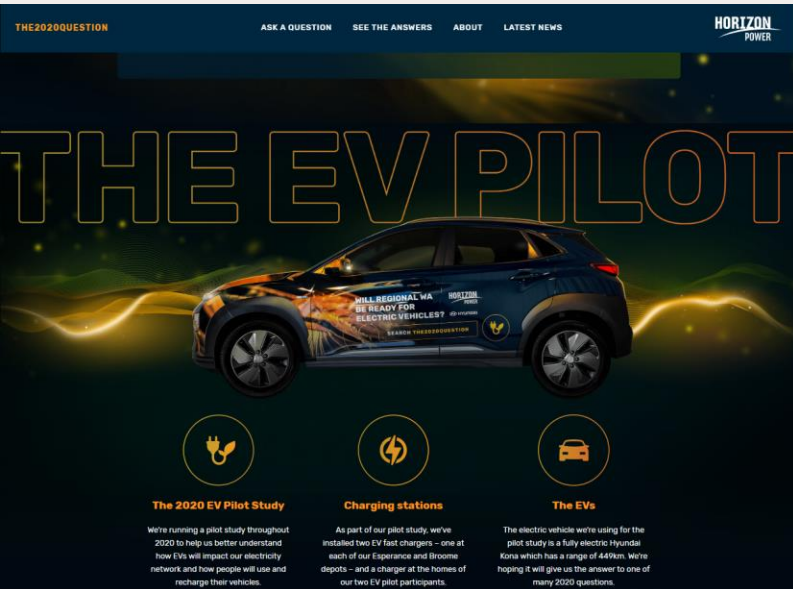


Figure 2: Screenshot of The 2020 Question campaign landing page

1

Campaign overview

Launched in January 2020, the campaign was designed to educate the public that Horizon Power was preparing for the uptake of EV in regional WA.

Customers could ask questions via Horizon Power's website around EV's to find out more about EVs.

2

Campaign creative

A unique visual identity was developed for the campaign, designed to promote the campaign, and direct customers to the2020question.com.au

3

Campaign response

Response to the Campaign: The campaign was well-received, with a total of 84 unique questions submitted.

The majority of the questions revolved around EV battery life, availability of fast charging stations, and how to charge an EV at home.

4

Campaign outcomes

The campaign helped us understand our customers' curiosity and concerns about EVs, and gave us insights into the potential barriers to EV adoption.

The responses also served as valuable feedback, which can be utilised in future planning and decision-making processes.

EV Charging insights

3 Public Fast
Chargers

6am Peak time
Esperance

158 Charging
sessions

8am Peak time
Broome

376 Hours
spent charging

2,650kW
consumed

1

There is a learning curve to know when to charge

Charging sessions decreased while the total time spent charging increased.

This could suggest that over time, individuals may gain a better understanding of the capabilities and limitations of the EV and charging infrastructure, so as to better optimise when to charge the vehicle around daily priorities and commitments.

2

Increased Charging Duration

Despite a decrease in the number of charging sessions per month from June to November in Broome, the average time spent charging per event increased by 75%.⁵

This suggests that customers are becoming more familiar with the charging process and have ease of amenity to be have more time charging at the location.

3

Peak Charging Times

Most vehicle charging (70%) was conducted between 8am and 4pm. The peak charging times were at 6am for Esperance and 8am for Broome.⁶

Understanding these peak times can help us manage load on the grid effectively.

4

Charging Days

Vehicle charging in Broome was most common on Wednesday and Friday, while Esperance saw a more evenly distributed charging profile throughout the week.⁷

This insight can assist us in predicting peak charging days and managing power demands accordingly.

5. Figure 2, Appendix
6. Figure 3, Appendix
7. Figure 1, Appendix

EV Driver findings

1

Participation & Motivation

All respondents were keen to try out new technology, showcasing a strong interest in innovation and a regard for energy reduction and environmental consciousness.

2

EV Experience vs Expectations

All respondents indicated that their experience driving the EVs was much better than anticipated. However, opinions varied on whether they would consider an EV as their next vehicle.

This highlights that barriers to EV adoption exist beyond the user experience.

3

Preferred Battery Charge Level

Unlike with traditional vehicles, respondents preferred to keep their EV battery charge at or above 75%.

This likely reflects concerns about the limited availability of charging infrastructure in the regions and the associated range anxiety.

4

Satisfaction with Hyundai Kona

Respondents were largely satisfied with the Hyundai Kona, although range and charging time were ranked the lowest.

This feedback could be valuable for future vehicle selection and charging infrastructure planning.

5

Likelihood of Recommending an EV

Despite some concerns, all respondents indicated that they were likely or very likely to recommend an EV to someone they know.

EV Pilot findings – barriers and challenges

1

Application Process for EV Chargers

Currently, EV chargers go through the same process to connect to the network as other new load / connection requests.

We may need to look at building in new requirements to our technical standard to manage load.

2

Pricing signals

Implementing pricing signals to influence customers' charging times to reduce peak demand proved challenging.

More research is required to understand how best to encourage EV charging during off-peak time periods.

3

Visibility of Charging

The inability to see when and where charging is occurring poses a significant challenge for effective grid management.

This lack of visibility hinders our ability to accurately assess the impact of EV charging on the network.

4

Inverter Network Standards

With the uptake of EVs and the associated charging infrastructure, there is a need for improved visibility for inverter network standards.

These standards should address the potential impact on power quality and system security.

We're working on a range of both product based and technology based solutions that will address some of the key barriers and challenges.

Overcoming these challenges is critical for the continued adoption of EVs on our network.

Conclusion and Recommendations

1

Understanding customer needs

The insights into customer behaviour, preferences, and concerns are invaluable.

We recommend continuous engagement with customers to tailor our services and infrastructure to their needs.

2

Addressing barriers

The identified challenges in energy management, and inverter standards must be addressed.

We're exploring new technology to manage charger demand and this can be achieved with visibility on inverter guidelines and standards.

3

Customer education and awareness

Many questions and concerns can be addressed through education and awareness campaigns.

We recommend ongoing efforts to educate the public about EVs and our initiatives.

4

Leveraging insights for future planning

The pilot's findings should guide future strategy and planning.

We recommend that these insights be used to shape future pilots, projects, and initiatives, ensuring that they align with customer needs and expectations.

5

Continued collaboration with stakeholders

The engagement and feedback from stakeholders have proven valuable.

We recommend continued collaboration to ensure that our strategies and initiatives align with broader community and industry goals.

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Appendix

Figure 1: Percentage of total charging time by day of week

While not a part of the EV Pilot, the Bentley (Perth) charger provides valuable insights that support and complement the data from the regional depot public chargers. As the Broome Visitor Centre EV charger has recorded only two charging events, and with these being less than 1 kWh of consumption, this data has been omitted to simplify the visualisations.

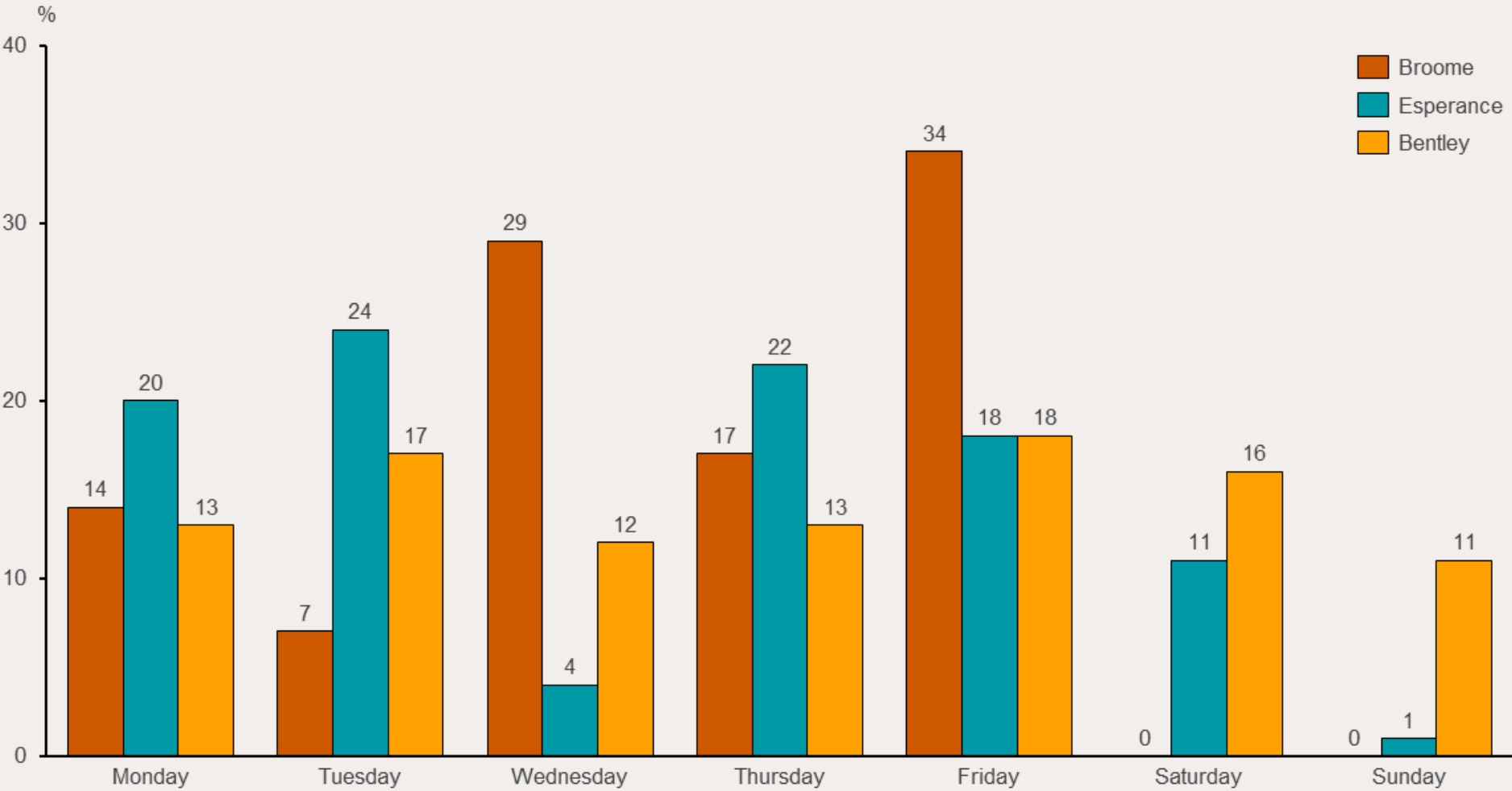
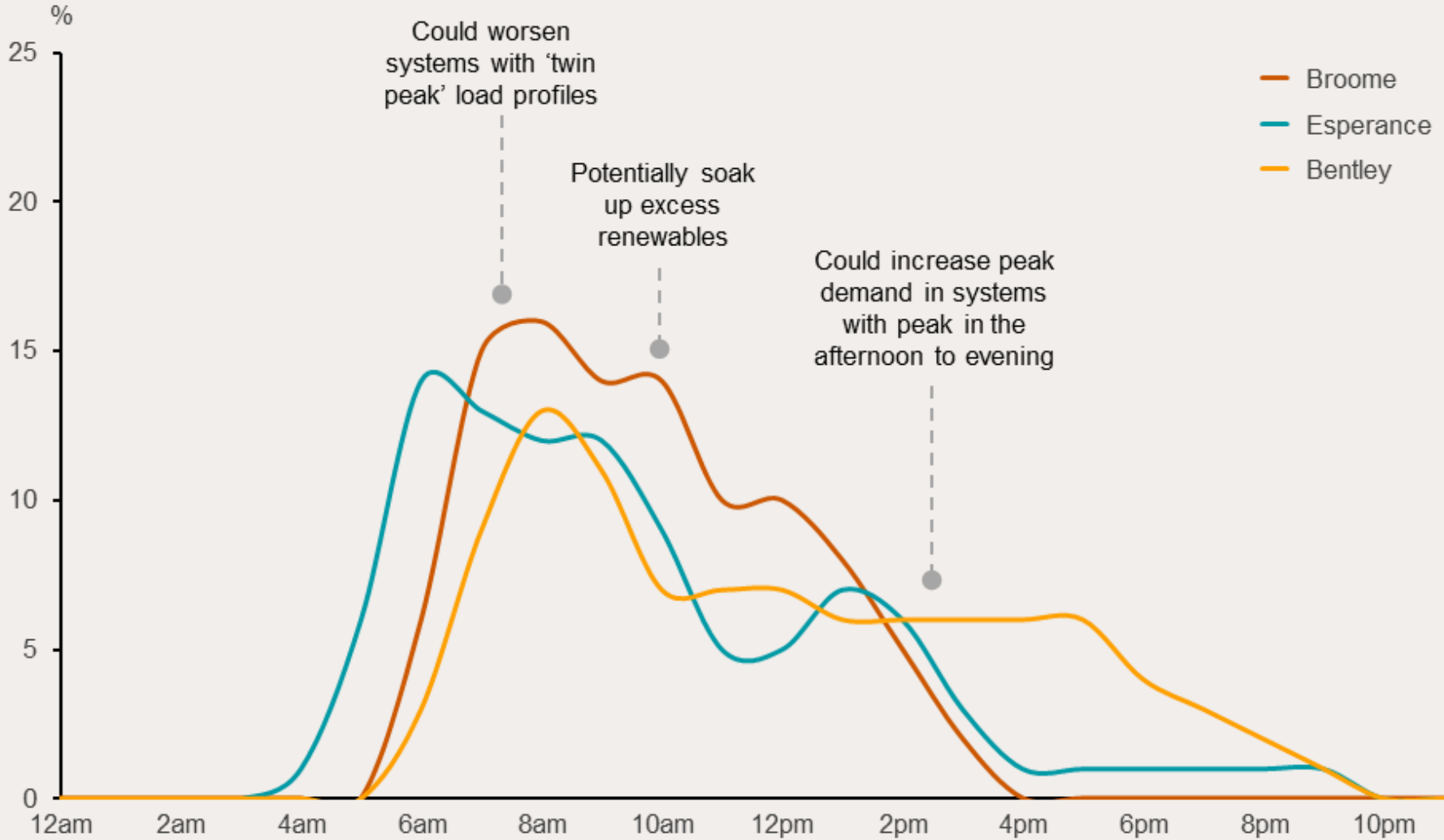
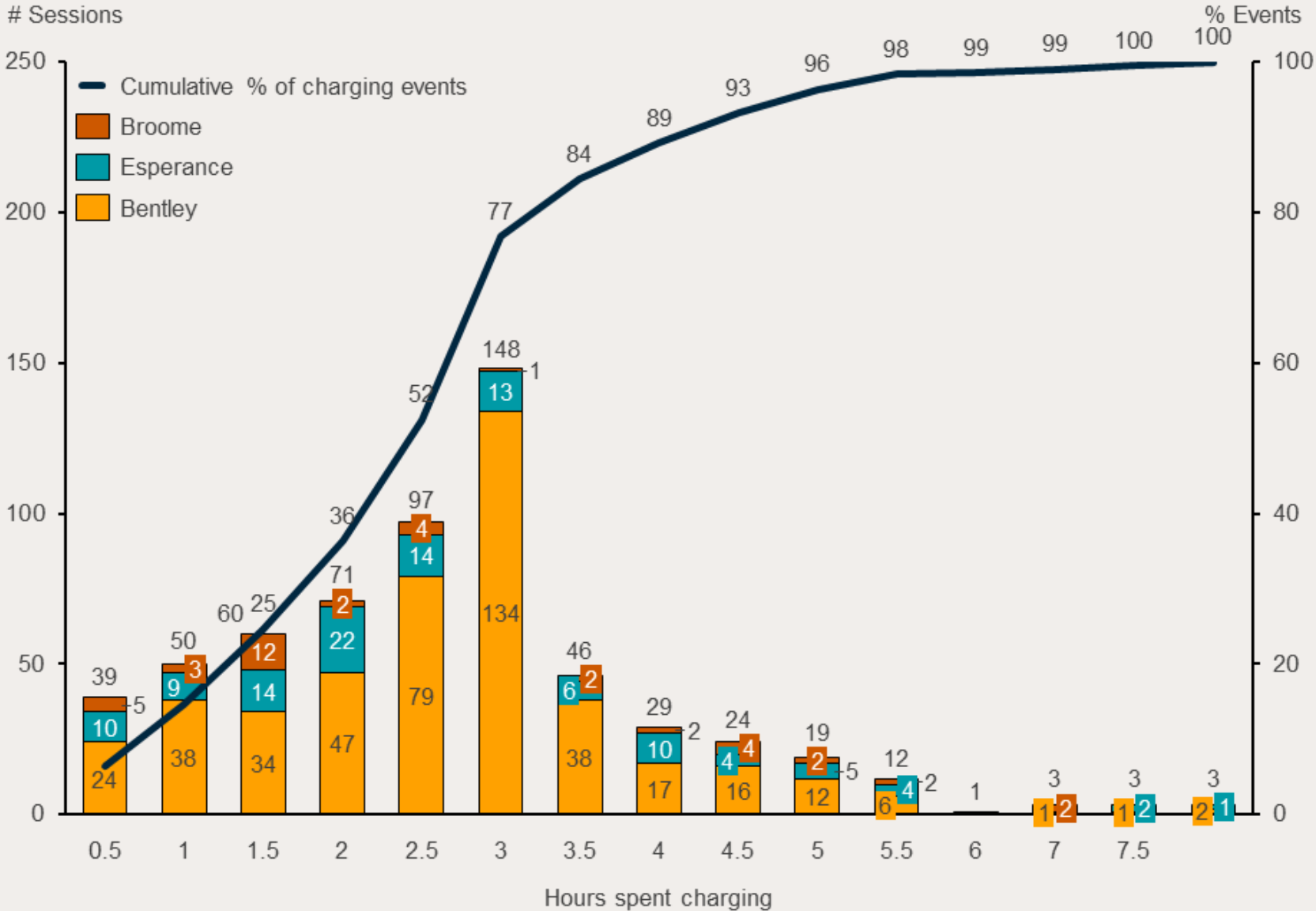


Figure 2: Percentage of overall charging time, by hour and location



Includes Bentley charger data

Figure 3: Number of charging sessions by hours spent charging



Includes Bentley charger data