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Lessons Learnt Report – March 2023

Lead organisation:	Fast Cities Australia Pty Ltd (trading as Evie Networks)		
Project name:	National Ultrafast EV Charging Infrastructure Network		
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Report date:	Milestone 5: March 2023		
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Executive Summary

Since the last report, the uptake of electric vehicles (EVs) has continued to grow at a rapid pace. The volume of EVs sold has increased to 5000 vehicles per month, up from 900 at the time of the last report. The proportion of new car sales is now consistently over 5%, considered by many to be a tipping point for mass market adoption. Alongside this increase in demand the public profile of EV charging has also expanded, with recent media coverage on various topics such as peak day queuing, charging point reliability, issues with EV owners blocking charging points (also known as "ICEing"), and equity in access to charging points.

Despite the progress made in the EV industry, barriers to deployment of public fast charging infrastructure remain the same as they were when this program commenced, with the key dependencies continuing to be site host agreements and power connections. We demonstrate the power connection barrier in this report, with some connections taking nearly 3 years from initial application to energisation. There are a number of reasons behind these delays and not all are due to distribution network processes, but it is clear that there is significant improvement required if infrastructure is to be deployed in an efficient manner.

Electricity costs continue to be a major challenge for Charge Point Operators (CPOs). We have reported on this issue previously and continue to work via the Electric Vehicle Council, the goal being to reach industry consensus on an approach to address the structural issues with existing tariffs. The key point that needs to be addressed is that many driver segments will not have access to home charging and public fast charging will be the only way for them to charge reliably. Without affordable public fast charging those segments will be precluded from making the transition to electric transport and over time will end up paying more for transport than other drivers. There is a clear social equity issue with the structure of tariffs.

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Project Status

Evie Networks' National Ultrafast EV Charging Infrastructure Network involves the development and construction of at least 42 ultrafast EV charging sites located along Australian major highways in Queensland, New South Wales, Victoria, Australian Capital Territory, South Australia, Western Australia and Tasmania.

- Spaced approximately 150km apart, these charging stations will support the full range of passenger and light commercial EVs, with both the CCS2 and CHAdeMO connectors prevalent in the market.

- Each site will be built with at least two ultrafast DC chargers, each providing up to 350 kW, though many sites will be future-proofed with sufficient infrastructure deployed to support expansion up to six chargers, including a high-capacity grid connection to match. All sites will be powered by accredited renewable energy sourced competitively from the market.

As of March 2023, there are 23 ultrafast charging sites commissioned, in line with planned ARENA milestones:

- Cameron Park NSW, Jamisontown NSW, BP Northpoint VIC, Sutton Forest West NSW, Paralowie Village Shopping Centre SA, Coochin Creek QLD, Seven Hills NSW, Dandenong VIC, Coomera QLD, Bundamba QLD and Taylors Lakes VIC are all located on the fringes of major capital cities and are designed for up to six 350kW chargers in anticipation of high traffic volumes in future. Coochin Creek and Bundamba have high-capacity connections directly to the Energex 11kV distribution network via a custom-built isolation transformer. Coochin Creek also has a shade canopy with integrated solar PV.

- Toowoomba QLD, Warrenheip VIC, Tarcutta NSW, Avenel VIC, Taree NSW, Townsville QLD, Campbell Town TAS, Tailem Bend SA, Brighton TAS, Macksville NSW, Maclean NSW and Westbury TAS, which are located in remote regional locations are designed to host two 350kW chargers and are connected at LV with capacities ranging from 400-500kVA per site.

Figure 1: New Evie Networks charging sites launched at Cameron Park NSW (left) and Toowoomba QLD (right)

Lessons Learnt

Lesson Learnt #1: Update on driver demand across network

Category:	Commercial

Since the last report, Evie has experienced substantial growth in charging usage throughout its network, both at individual sites and overall. This can be attributed to growth in EV uptake. Over the lifetime of our charging sites, demand has consistently doubled every 4-5 months. Some sites are demonstrating high utilisation and as an example Evie has recently upgraded our Sutton Forest site, adding charging heads to double the capacity. We also note that there is significant variability of demand between sites and at different times. Remote regional sites continue to operate at low utilisation except during holiday periods.

Generally, it is observed that utilisation increased significantly over the last 12 months, with NSW demonstrating the greatest growth. It is worth noting that utilisation is a function of many factors, including market demand, network coverage, seasonality and the relative characteristics of the sites.

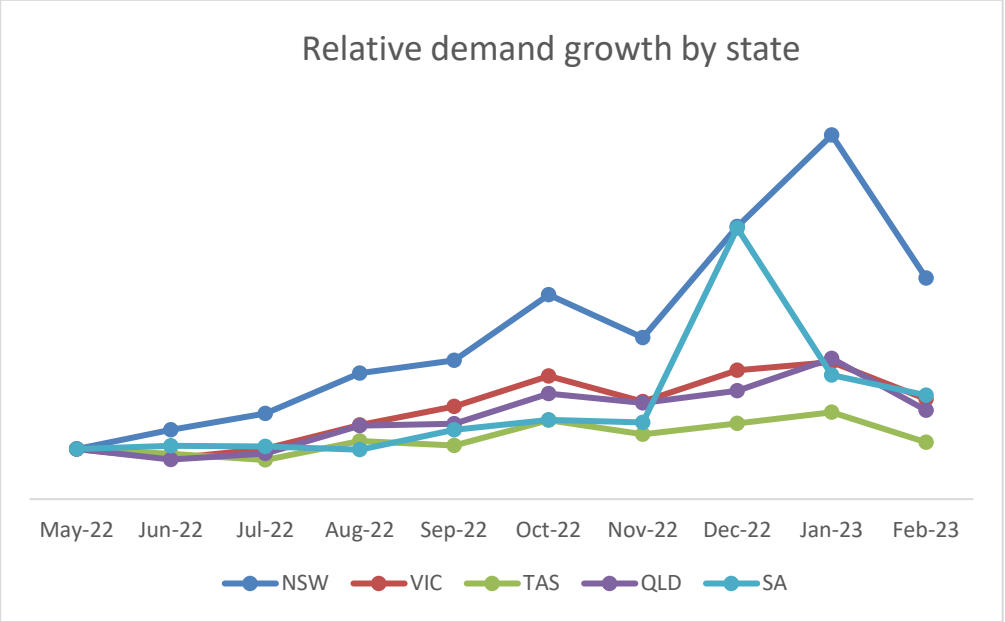

Figure 2: Relative utilisation growth by state

Lesson Learnt #2: Time required for high power connections continues to be a major barrier

Category:	Deployment

A significant obstacle in the implementation of our highway project is the duration it takes to obtain power connection offers and finalize power works. A particular example is the HS007 Cameron Park location, where we initially submitted a connection request in May of 2020. It took 16 months for us to receive a power connection offer, and an additional 18 months to complete the power upgrade. Cameron Park is by no means an exception case.

Site	**Connection application started**	**Connection offer received**	**Site energised**
BP Northpoint - VIC	June 2020	Sep 2021	28/06/2022
Warrenheip - VIC	Apr 2020	Mar 2022	20/09/2022
Paralowie Village Shopping Centre - SA	Jun 2021	Dec 2021	30/11/2022
Toowoomba - QLD	Feb 2022	May 2022	22/12/2022
Cameron Park - NSW	May 2020	Aug 2021	22/03/2023
Proserpine – QLD	Feb 2022	May 2022	Apr 2023

Table 1: A table of highway sites showing connection offer timing, and time to complete power upgrade.

We are investigating options including battery and solar to abrogate the need for a grid connection upgrade. We are also focusing on ways to streamline the power connection process, including engaging with distribution networks earlier in the project planning stages.

Lesson Learnt #3: Distribution network tariffs and connection processes are still not aligned with the needs of EV charging infrastructure

Category:	Commercial / Regulatory

DNSP tariff structures with Demand or Capacity charges are not appropriate for the fledging EV Charging Infrastructure Industry given its very different load profile relative to “traditional” businesses and low usage levels at this stage of the industry’s development. This very different load profile would support the introduction of a technology specific or customer specific tariff in this area (i.e. a specific tariff for publicly available EV charging sites).

At this time we are only exposed to Demand or Capacity charges on a small number of highway sites, however over time we expect end up on demand charges for all our highway sites apart from those sites in Tasmania. Depending on the DNSP, Demand or Capacity charges are imposed when utilisation passes 40MWh pa (Ausgrid), 100MWh pa (Energex, Ergon) or 160MWh (although some DNSPs have a different methodology for applying Demand or Capacity charges, such as SAPN).

Figure 3 below demonstrates the impact of Demand or Capacity charges a hypothetical site in NSW, when it passes the 160MWh threshold. At this time, 73% of electricity cost is made up from network charges and the cost of electricity is estimated to be 61c ex GST. This level of electricity cost would require CPOs to charge a high price to drivers in order to recoup investment, thereby undermining the savings that EVs offer for those driver segments that depend on public fast charging.

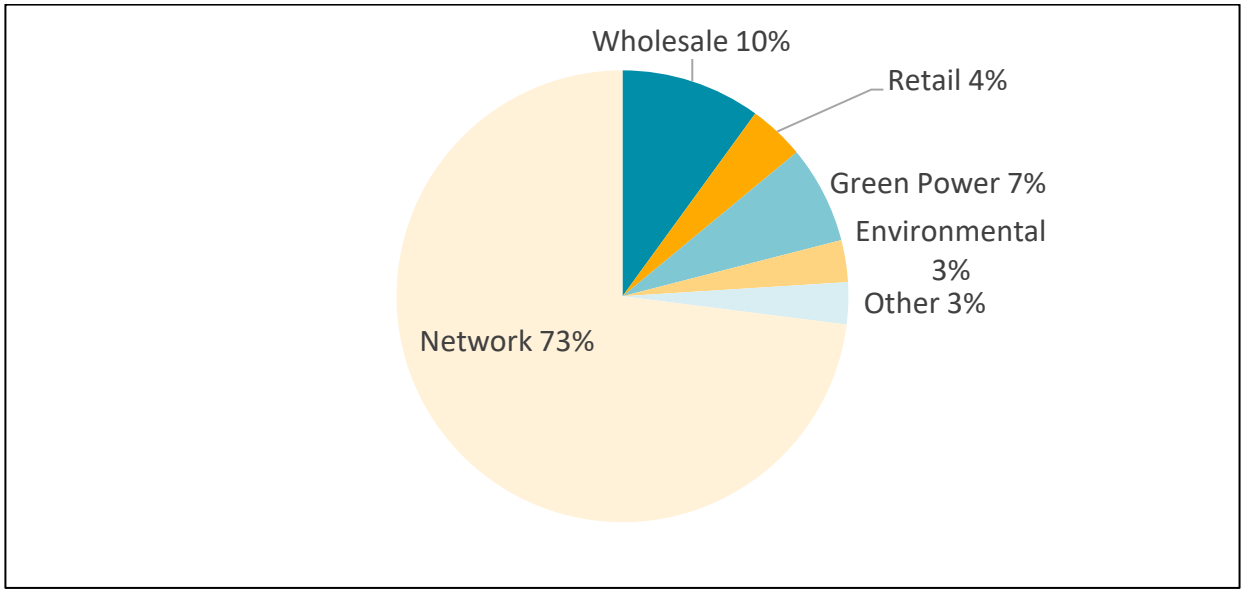

Figure 3: Breakdown of cost by category for an NSW DNSP after passing the 160MWh threshold to transition to a demand charge.

Not only would public fast charging not be affordable in these areas (if CPOs price rationally to cover costs), but networks would miss out on the opportunity to support the transport transition to electric.

Public fast charging has different characteristics to traditional loads, is highly controllable and aligns well with solar generation. More affordable and accessible public fast charging will help to further drive the uptake of EVs, resulting in greater network utilisation and efficiency, as well as helping the transition to a cleaner energy future. Ultimately, the adoption of cost-reflective technology-specific tariffs should be a win-win situation for networks, CPOs, drivers and all electricity consumers.