
Lessons Learnt Report – October 2021

Lead organisation:	Fast Cities Australia Pty Ltd (trading as Evie Networks)		
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Executive Summary

A vibrant charging industry is critical to support the take up of EVs, especially as demand accelerates over the coming years. Government and industry should be aiming for an outcome where ongoing investment in charging infrastructure does not require subsidies. Today we still see an EV charging value chain that is disconnected and/or irrational and has a negative impact on forecast investment return. It is important to address the current issues to while the EV industry is still in early stages, to ensure long term sustainability of EV charging business models and promote further investment.

This lessons learnt report identifies three current challenges and their impact:

1. Demand for public charging is still in early stages.
2. Free or heavily subsidised pricing for fast charging distorts demand.
3. Distribution network tariffs are not cost reflective and connection processes are not aligned with EV charging infrastructure, resulting in a high cost base that will be passed on to drivers.

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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 October 2021, there are sixteen ultrafast charging sites commissioned, in line with planned ARENA milestones:

- 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.
- Tarcutta NSW, Avenel VIC, Taree NSW, Townsville QLD, Campbell Town TAS, Taillem 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.
- A further four sites are effectively now “power contract complete” with an anticipated commissioning date of end 2021 / early 2022.



Figure 1: New Evie Networks charging sites launched at Westbury TAS (left) and Maclean NSW (right)

Lessons Learnt

Lesson Learnt #1: Drivers of demand for public charging

Category:	Commercial
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Since launching the first highway ultrafast charging station in November 2019, Evie has seen steady growth in charging across the network, both at a site level and aggregate level. In the three months to June 2021 Evie provided kWh of energy that matched the previous 18 months. This is partly due to network growth but can also be attributed to growing demand from drivers.

Despite this growth, demand for charging stations is still low, with average utilisation of approximately 1% in September. Some sites are operating significantly above this average, with others significantly below. The variability of utilisation has highlighted issues with pricing, as mentioned in the Lesson Learnt #2 section, as well as challenges with intrinsic demand.

Since July, utilisation has been impacted by COVID lockdowns in NSW and VIC. There has been a lesser impact on states that have not been in lockdown, although we suspect that demand in South East Queensland and South Australia has been lower due to reduced traffic from New South Wales and Victoria respectively. At the low point in August we observed demand in NSW had dropped 78% from June while demand in Victoria had dropped 54%. The impact of COVID on the different states is shown in Figure 2 below.

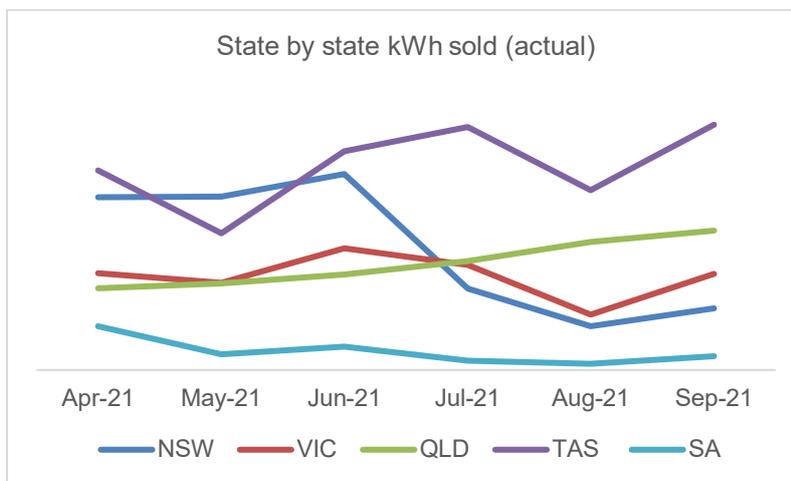


Figure 2: Impact of COVID on demand for highway charging.

Long term, the fundamental driver of demand for public charging will be EV uptake. Australia still lags other right hand drive countries such as UK and New Zealand. In September Battery EV (BEV) sales were 15% of sales in the UK and 9% of total sales in NZ. By comparison, the EV Council “State of Electric Vehicles 2021” report noted BEV sales at 1.3% of total sales in 2021.

We also note that the greatest benefit, both for charging network demand and sustainability objectives, will come from high km vehicles, typically operated by professional drivers. Yet EV uptake has also been slow among this driver segment. Without significant improvement in EV uptake across all segments we expect continued low demand for charging infrastructure in Australia.

Lesson Learnt #2: Free and subsidised pricing for public charging is distorting demand for charging

Category:	Commercial
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Evie’s September 2020 Lessons Learnt report highlighted that different pricing tactics were confusing the market. In this report we build on this learning with further experience and data from our expanded network.

While vehicle uptake and demand for EV charging are low we observe there are a number of operators offering public charging for free or at a heavily subsidised price. Examples of networks offering free or subsidised charging include:

1. Yurika – currently priced at \$0.20 per kWh, which is less than the cost of electricity.
2. NRMA – currently free but planned to be free only for members in the future.
3. Various councils that are offering free or low cost charging.

One of the reasons for offering cheap public charging, anecdotally stated by some operators and site hosts, is that it will encourage EV uptake. This is incorrect for a number of reasons. Firstly, public charging typically makes up only 5-10% of driver charging needs and therefore is an insignificant portion of EV total cost of ownership. Secondly, driver research places the cost of public charging as a low priority, behind infrastructure coverage, availability and ease of use. Finally, rationally priced fast charging compares favourably with the cost of petrol and international benchmarks.

Evie observes that while drivers consistently state that the cost of public charging is of low importance when considering EV transition, they will still make an economically rational decision when offered a free or subsidised alternative. Evie data shows that the average demand at charging stations with a free or subsidised alternative (within reasonable range) is approximately 1/5th of a charger that does not have such an alternative. For example, at Townsville there is a Yurika charger 6km away that is priced at \$0.20 per kWh. There are numerous comments on Plugshare that reference Evie’s pricing at Townsville, whereas such comments are noticeably absent at Evie sites where there is no obvious free or subsidised alternative, such as Campbell Town in Tasmania. To the contrary, driver feedback is generally very positive regarding Evie’s investment in ultrafast charging to enable journeys.

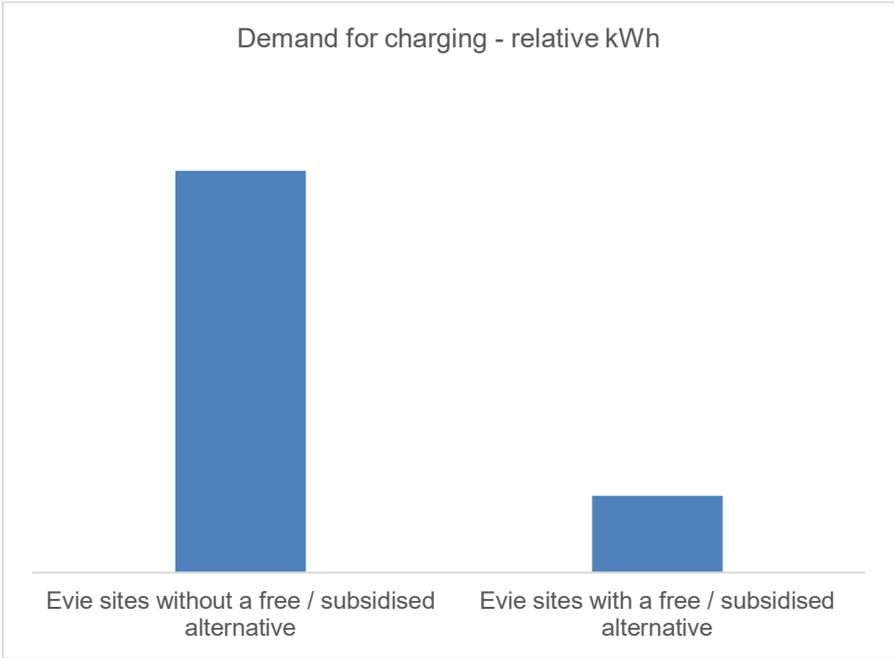


Figure 3: Impact of free or subsidised chargers on demand.

As a comparison, Ionity in Europe is priced at €0.79 per kWh (\$1.25 AUD) which was introduced in January 2020. Notwithstanding the impact of COVID lockdown, demand has continued to grow over time as shown in the chart below.



Figure 4: Charging behaviour of IONITY customers from September 2018 to September 2020 (source: Ionity)

Evie believes that free and subsidised charging unnecessarily distorts demand and sends the wrong message to drivers, given the level of investment required to deploy public fast charging. Furthermore it has the potential to stifle ongoing investment in charging infrastructure, a key requirement to support EV uptake.

Lesson Learnt #3: Distribution network tariffs are not cost reflective and connection processes are not aligned with EV charging infrastructure

Category:	Commercial / Regulatory
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In the September 2020 Lessons Learnt report Evie described the prohibitive distribution network tariff costs and described how they are not cost reflective for EV charging infrastructure, especially in the early stages of EV uptake. While there has been some success in Victoria, with a determination to allow opt-in to volumetric tariffs. In this report we will describe the learning from power connections in other states.

Depending on the territory, small business tariffs are applied for charging stations that have annual usage below certain thresholds. For most DNSPs this threshold is 160MWh per annum. In Queensland the threshold is 100MWh pa. Ausgrid stands alone with a threshold of 40MWh. Beyond this usage medium business tariffs apply, which include peak demand or capacity components to the tariff.

In these early stages of EV uptake, Evie’s charging stations are operating in accordance with small business thresholds. We find that DNSPs often seek to assign EV charging stations with a medium business tariff, the assumption being that a relatively high capacity connection will result in high usage. The impact of this is that demand charges are imposed and charging operators must pay electricity charges that are similar to a small factory with constant utilisation. This is despite the fact that EV charging utilises the site capacity for a very small proportion of the time, as shown below.

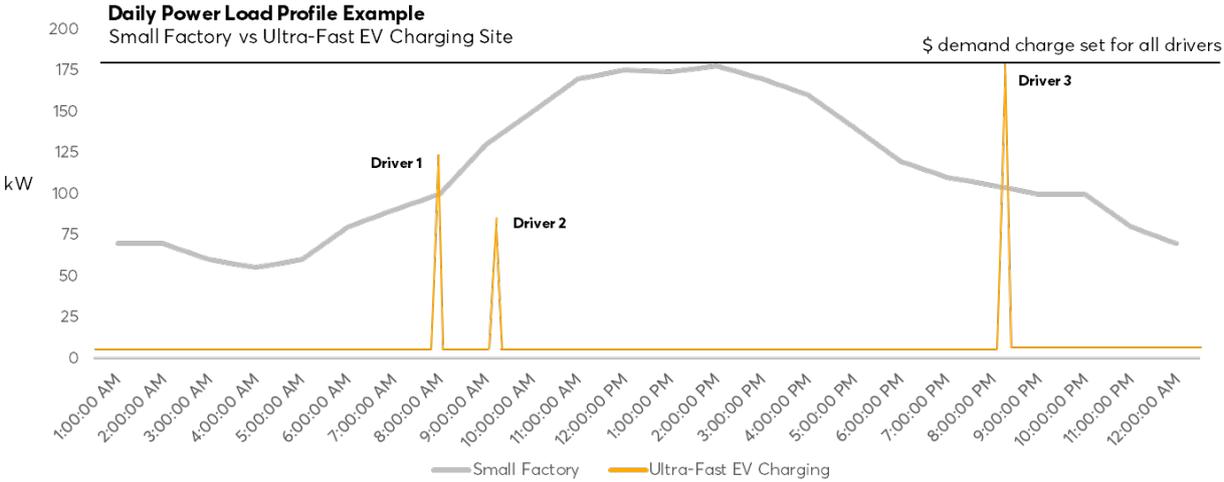


Figure 5: Illustrative daily load profile – small factory vs EV ultrafast charging

Evie has been able to work with most DNSPs to ensure sites are initially assigned with small business tariffs in line with existing tariff structure statements. The process has been unique and bespoke for each DNSP as there does not appear to be any standard approach for EV charging. In the case of Ausgrid sites have been assigned to medium business tariffs, triggering a lengthy process to re-assign the sites to small business tariffs. In the case of Mosman (a single 50kWh fast charger) this process has taken 10 months, despite Evie providing data on a number of occasions to demonstrate that usage was below the small business threshold.

The chart below demonstrates the high costs paid to Ausgrid for the Mosman charger while it was assigned the EA302 medium business and EA256 small business tariff. The cost for the preferred tariff is also shown for reference. Evie has had to pay approximately \$5,000 in additional costs to Ausgrid over the first 10 months. During this period the equivalent cost per kWh sold to drivers was from \$1.08 to \$0.38, depending on the actual tariff applied. Meanwhile drivers have been charged \$0.36 (ex GST). This charger has only recently been reassigned to EA225.

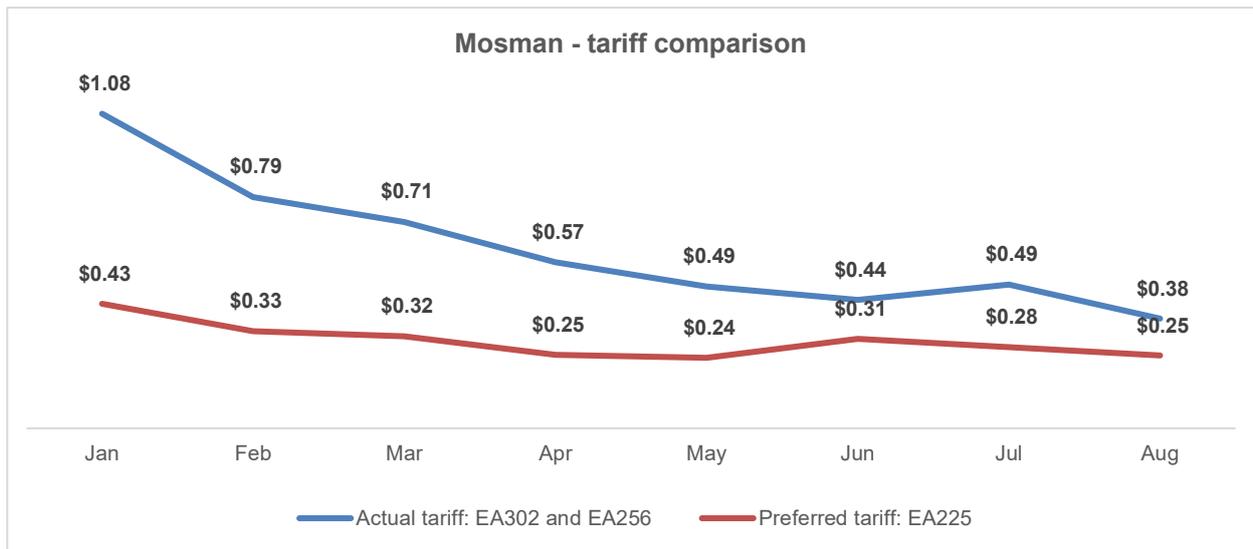


Figure 6: Cost per kWh sold to drivers for Mosman – actual tariffs and preferred tariff

Furthermore, with Ausgrid’s low threshold of 40MWh, Evie is likely to be reassigned to EA302 at a later time. We estimate that the average cost Evie pays will revert to \$0.60 per kWh sold. Unless tariff reform is achieved these costs will need to be passed through to drivers in Ausgrid areas.