EVC response to

SAPN Draft regulatory proposal 2025-2030

August 2023

With reference to:

https://www.talkingpower.com.au/draft-proposal

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Preamble:

The Electric Vehicle Council (EVC), Australia's national representative body for the EV industry, appreciates the opportunity to provide feedback on South Australia Power Network's (SAPN's) draft regulatory proposal for the 2025-2030 period.

The EVC notes that SAPN has undertaken substantial stakeholder engagement in the leadup to this point, which has included consultation with the EVC. We also note that SAPN are members of the EVC and are actively engaged in the EV space.

In this response, the EVC will principally address issues relating to electric vehicles and the arrangements supporting their recharging that are likely to be impacted by the approach described in the draft regulatory proposal in South Australia.

Executive summary of EVC position:

Australia is currently lagging much of the rest of the world in EV uptake. Within Australia, South Australia is performing the least well of all the states in terms of percentage of new vehicle sales that are electric, at approximately 6%[1] year to date.

In this context, it's clear that obstacles to EV uptake in South Australia need to be removed where possible. Given SAPN's function as the operator of the electrical distribution network in South Australia, there are some supportive actions which cannot be readily implemented by anyone other than SAPN.

The draft proposal from SAPN identifies in section 6.2.3 of Part B that the status quo, whereby all business connections >120kVA attract demand or capacity charges, will remain in place. We note that this position will entrench South Australia as having the least supportive tariff arrangements in the country for high power public EV charging. This approach can be expected to limit the deployment and capacity of public EV charging in South Australia, particularly in regional areas, slowing down an already lagging state-level transition to EVs. A better approach in this respect would be for SAPN to align with the rest of the country, as outlined in the detail below.

The EVC notes the inclusion in the draft proposal of a $97.8 million program around CER integration. Within this program, $15 million is allocated to 'demand flexibility'. This proposal aims to create the capacity for centralised control of consumer loads, such as EV charging in homes, with one of the goals being to "minimise costs to integrate Electric Vehicle (EV) charging".

Data from multiple ARENA trials indicates that centralised control of EV charging is unlikely to be economically efficient. General consumer behaviour around EV charging is demonstrably already 'grid friendly', and can easily be made more so through incentivisation, without the need for centralised control solutions.

Read in combination with the first item, it appears to the EVC that SAPN's draft regulatory proposal will have the effect of driving up the cost and limiting the capability of public EV charging, while at the same time progressing efforts towards controlling EV charging in South Australian homes.

On residential tariff reform, we note the design of the 'Residential Electrify Export' tariff, intended to be paired with the 'Residential Electrify' consumption tariff. The intent of the combination is to encourage consumption and export patterns that support the energy system, with the goal of rewarding the EV owning consumer for behaviour that helps drive down costs for everyone.

Conceptually this is excellent, and should serve to support V2G, subject to technical requirements from the Office of the Technical Regulator being brought into step with the rest of the country. One of the crucial details which will need attention is the degree to which consumption at peak time is priced, which we address below.

Finally, we address visibility of information related to network capacity, and how this might be improved to aid the transition to EVs.

[1] https://electricvehiclecouncil.com.au/wp-content/uploads/2023/07/State-of-EVs_July-2023_.pdf

Specific commentary

kVA-based demand charges for business customers at connections greater than 120kVA

The rest of the country provides volumetric thresholds for business customers, so that low-energy use sites are able to opt out of kVA or kW based demand and capacity charges. This is either enabled via state government order-in-council (Victoria) or via the DNSPs tariff structures as approved by ERAWA (Western Australia) or via the DNSP tariff structures as approved by the AER (the rest of the country).

In Western Australia, Victoria, NSW, Tasmania, and the ACT this volumetric threshold is either set today, or soon to become by way of the 2024-2029 regulatory reset process, 160MWh/annum. In QLD the threshold is currently set at 100MWh/annum. In NT the threshold is soon to become, by way of the 2024-2029 regulatory reset process, 100MWh/annum.

In terms of quantitative impact, if we consider a 500kVA EV charging location (a typical supply for a site with 4 x ultrafast charging bays) delivering 100MWh/annum, the network component of the cost in a few example jurisdictions are:

- SAPN[2]: **~$14,000 demand/capacity charges + ~$12,700 in energy charges**
  - 365 days * $0.0771/kVA/day * 500kVA
  - ~12.7c/kWh (average of ToU prices on SBTOUD tariff)

- Powercor[3] (Vic): ~$11,000 in energy charges.
  - No kVA-based charges.
  - ~11c/kWh (average of ToU prices on NDTOU tariff)

- Essential Energy[4] (NSW): ~$13,000 in energy charges.
  - No kVA-based charges.
  - ~13c/kWh (average of ToU prices on BLNT1AO tariff)

- Western Power[5] (WA): ~$12,000 in energy charges.
  - No kVA-based charges
  - ~12c/kWh (average of ToU prices on RT4 tariff)

The reason South Australia comes out at about double the cost of any other jurisdiction on network costs for a site of this type is that in the other jurisdictions, while the costs for energy (c/kWh) are comparable, the sites are able to opt out of the kVA component. Access to these tariff structures is not because they're EV charging locations, but because that option exists across the rest of the country for all small business customers.

At lower utilisation levels, the impact of the $14k per annum per site in demand charges is more keenly felt, because there is far less energy delivered to drivers from whom the cost

[2] https://www.sapowernetworks.com.au/public/download.jsp?id=320662

[3] https://media.powercor.com.au/wp-content/uploads/2023/05/17152236/Powercor_2023-2024_Pricing_Proposal.pdf

[4] https://www.essentialenergy.com.au/-/media/Project/EssentialEnergy/Website/Files/Our-Network/NetworkPriceListandExplanatoryNotes202324.pdf

[5] https://www.westernpower.com.au/media/6630/network-access-prices-approved-price-list-20230613.pdf

can be recovered. A site delivering 2 x 50kWh top-ups per day on average, enough for each driver topping up to cover ~250km, will only use 40MWh/annum. At this level of utilisation, 500kVA South Australian EV charging sites will be subject to network costs about 4 times higher than comparable sites in the rest of the country.

A rational response to this tariff arrangement from the charging network operators will be to limit the power requirement of the site to 120kVA, in order to stay within the kVA threshold that creates the cost. This would logically result in charging sites being deployed with fewer EV chargers, and the power output of those chargers being limited, especially at times when more than one vehicle is present. This will predictably create queuing and delays for drivers, at times and places of occasional high demand in the transport system, such as on long weekends on holiday routes. This experience, shared by existing EV drivers to prospective EV drivers, will predictably slow down EV uptake in the state.

Higher costs borne by the charging network operators, should they choose to deliver outcomes in South Australia comparable to the rest of the country anyway, will naturally be passed through in prices to consumers, which will predictably have an additional negative impact on EV uptake.

The EVC's position is that SAPN should align with most of the rest of the country on a volumetric level of 160MWh/annum, below which a customer can opt out of kVA-based charges.

We note specifically that the EVC is not looking for special treatment of EV charging installations in this matter. We seek the availability in South Australia of the same types of business tariff structures that are readily available everywhere else in Australia.

We note that SAPN already has in place the option for consumers with connections <120kVA, and <160MWh/annum usage, to opt out of kVA-based charges. The number of consumers with connections ***above*** 120kVA, who are still consuming <160MWh/annum, is very small, because the vast majority of connections above 120kVA use more than 160MWh of energy each year. According to SAPN's work on this matter[6] undertaken at the request of the EVC, only 446 of the ~915,000 connections that SAPN serves fit this profile.

SAPN's impact analysis suggests that if all 446 of these customers were permitted to move to avoid kVA-based charges, and then did so, and the impact was then spread specifically across other small business customers, the bill impact on those other customers would be on the order of 0.7%. The total differential value we're considering here is on the order of $1.4m/annum. Were the bill impact to be spread across a wider cohort of customer types (for example all business customers, or all customers), and some figure less than 100% of the 446 eligible customers were to change their tariff arrangements (which is much more realistic than a 100% transition), the 0.7% figure would be less.

Ausgrid undertook similar analysis in response to industry feedback to their 2024-2029 regulatory reset. They identified that permitting all consumers with consumption <160MWh, at connection size above 100kVA, to avoid kVA based charges would potentially result in bill impacts at the level of 0.3% if those impacts were spread across the consumer base, AND if all eligible consumers moved to avoid kVA-based charges.

The true bill impact of this measure on other consumers, assuming that half of eligible consumers change their tariff arrangements, and that the costs were spread across all consumers, is therefore likely on the order of 0.1% to 0.2%. While the number is tiny, this is

[6] https://www.talkingpower.com.au/tariffs - see workshop 3 notes, slide 45.

not the key takeaway here. The uptake of EVs which is ***enabled*** by this measure will actually put downward pressure on energy bills, because the vast majority of EV charging will happen at non-peak times, in domestic homes. This is addressed in the next section.

In terms of additional justifications offered by SAPN for not aligning with the rest of the country on this matter, we note from section 6.2.3: *"SA Power Networks does not want to create large price steps between tariff classes and create tariff boundary issues."*

The existing tariff structure defines the boundaries that SAPN states it does not wish to create. The transition from SDBTOU to LBAD, which is what currently happens if a commercial site exceeds the 160MWh/annum threshold, is marked by:

- the daily service change increasing from 66c/day to $6.90/day,
- the cost of energy during the day falls from 19c to 7c per kWh,
- the demand charge associated with the annual peak rises from about 8c/kVA/day to 29c/kVA/day.

For our example site above, at 500kVA and 160MWh/annum, the changes under the current tariff structure for a customer at the threshold are:

- supply charge goes up by ~$2k/annum
- demand charges go up by ~$38k/annum
- energy costs go down by ~$19k/annum

Tariff boundary issues have been entrenched for a long time and will remain for as long as there are different tariff classes, and eligibility conditions that determine which tariff class is applicable to a particular consumer.

While the EVC agrees with SAPN that avoiding significant step changes at the boundaries would be good, avoidance of step changes is not a feature of the draft proposal as currently written, and the use of this rationale as a justification for refusing to support low-utilisation customer sites cannot withstand scrutiny.

Orchestration of EV charging in homes and the network benefits of at home EV charging

Multiple trials have been undertaken with ARENA support (Origin, Jemena, AGL) to explore the scope for orchestration of EV charging to provide value to the energy system, and to understand at home charging behaviour. Data has been collected and analysed by C4NET from Victorian smart meters associated with consumers that have taken advantage of state government grants to buy an EV. Energy Queensland has run an insights program amongst EV owners. Tesla collect and analyse data direct from their vehicles in Australia.

The baseline across all of these data sets indicates that typical contribution to electricity system peak demand per EV is on the order of 250W. Where efforts have been made in the various trial programs to incentivise deferral of EV charging to a non-peak time, without actual control of the EV chargers being applied, those efforts have proven highly successful, driving average contribution at peak time down to values on the order of 100W per EV. There is also an irreducible minimum – some level of 'charging at peak time' that will occur regardless of efforts at control – which appears to be on the order of 50W per EV.

The value of orchestration, in terms of potentially avoided network augmentation costs, is the difference between what can be achieved with price signals (100W/EV), and what can be achieved with orchestration (50W/EV). It should be noted clearly that for the ***consumer*** to derive a benefit from charging at the 'right' time of day, no external orchestration is needed – the consumer has a variety of easy ways to do this[7], starting with setting their preferred charging time in their car, just like they'd set a preferred radio station.

If we consider SAPN's LRMC per the last regulatory proposal of $69.30 / kW / annum[8], the value of each orchestrated EV charger, in terms of avoided network cost, is about $3.47 per year - this being the 50W/EV difference between what can demonstrably be achieved ***without*** control, and the floor level of what can be achieved ***with*** control, multiplied by the LRMC figure.

This $3.47 per EV charger per year isn't the ***net*** benefit. It's the top line benefit in terms of avoided network costs before the operating costs of the solution necessary to secure the benefit are taken into account. In order to secure this benefit, the charger needs to be smart, connected, and cyber secure. The consumer needs a help desk to call if something goes wrong. The software platform linking all the bits of the system together needs to be maintained. A wide variety of costs, well explored in the reports produced for the ARENA-funded smart charging trials, need to be addressed.

The SAPN draft proposal on this matter is to spend $15m on this element in the 2025-2030 period in order to create a capability that, if it is applied to EV charging, will predictably cost consumers significantly more than it will save them. If we take a conservative estimate on the operating cost of this solution of $100 per annum per EV participating, and assume a future state in 2030 where 40% of the 260,000 vehicles predicted by SAPN to be in South Australia are participating (Page 58 of part A of the draft proposal, section 5.1.3), then in addition to the $15m capex cost of this solution which will present on consumer's energy bills over a five year period, consumers will be carrying a $10.4m annual operating cost… in order to deliver a benefit of about $350k per annum to SAPN in the form of avoided network augmentation.

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[7] https://qhes.com.au/survey-results-2022/electric-vehicles-2022/ see "Controlled EV charging time"

[8] Page 82: https://www.aer.gov.au/system/files/SAPN%20-%20Revised%20Proposal%20-%20Attachment%2017%20-%20Tariff%20Structure%20Statement%20Part%20B%20-%20Explanatory%20Statement%20-%20December%202019_0.pdf

If instead of the conservative '$100 per participating EV' cost used here, we apply the actual costs associated with the ARENA programs that delivered home EV charging orchestration (100% subsidised smart EV charger installation, properly managed help desk to resolve customer problems, etc etc) then the cost to secure this benefit rises to about a quarter of a billion dollars in CAPEX (~100,000 smart chargers, at ~$2,500 each), and $50m/annum in operating costs borne by the consumers (given the ~$500 per annum per EV operating costs we understand to be referenced in the forthcoming AGL ARENA report).

On the flip side of this, we can consider the benefit that home EV charging brings to the network when it is not controlled but is instead left in the hands of the consumer.

A typical EV will consume about 2500kWh of energy each year, most of which will be consumed at home behind a residential connection. Assuming peak demand contribution of 250W per EV (the existing baseline), and based on SAPN's stated LRMC, the cost of network augmentation created by home charging of each EV is ($69.30/kw/annum x 0.25kW/EV) = ~$17 per annum per EV. If we assume that ongoing efforts to educate and encourage consumers to charge their EVs outside of peak times are successful, this figure will fall.

The contribution each EV driver makes to ***paying*** for network costs, however, is a function of the residential bill. This is analysed by the AEMC[9] in their price trends report. We see from this that in South Australia, the total price in c/kWh is about 35c, and that 12c/kWh of this goes to SAPN. Multiplying the 12c/kWh by the 2500kWh consumed produces a contribution to distribution network operating cost, by the residential bill payer, of $300 per annum per EV.

It's clear that EV owners are significantly subsidising other energy users in South Australia already, with ***contributions*** towards network costs from at-home charging being on the order of 15-20 times higher than the ***cost uplift*** being created by the additional peak load.

In the case of EV charging, the economically sensible move is to encourage well behaved charging with appropriate pricing structures, educate the consumers, and leave them in control.

The linkage between the first issue around commercial tariff arrangements, and this one, is:

If we consider the ~$1.4m in potential re-allocation of billing associated with ***all consumers*** (not just the EV charging station operators) with a usage profile of <160MWh/annum, and >120kVA connection size, opting out of kVA based charges….. it will take less than 5,000 passenger EVs operating in South Australia to fully offset the impact.

[9] https://www.aemc.gov.au/sites/default/files/2021-11/2021_residential_electricity_price_trends_report.pdf

"Residential Electrify" and the design of tariffs to support V2G.

The immediate goal in setting pricing signals to residential consumers in this domain is to encourage them to charge their cars at non-peak times, without creating a new system peak at a specific time.

Ideally vehicle charging will happen during periods of high solar generation, but it will often be more practicable for the driver to charge at home overnight. A wide variety of differentiated time-of-use (ToU) retail tariff products will likely serve this outcome admirably, but attention is needed in the detail.

We should note:

- That while the consumer has significant flexibility around timing of home charging, they'll have substantially less flexibility around heating and cooling loads. The acquisition of an EV will not automatically create the ability to avoid home usage at peak time from other appliances.

- That regardless of the residential tariff structure offered by SAPN, retailers will continue to offer flat tariff retail products in parallel with ToU products. According to the AER[10], approximately 96% of residential and small business consumers in South Australia are on flat or block tariffs. The political will to end the availability of flat tariff retail products to residential consumers does not exist.

The consumer considering a ToU retail product will be considering their whole load, inclusive of loads that can be easily moved in exchange for a cost saving (like EVs), and those that will create significant loss of amenity if they are moved, and which tend to occur at peak time (like heating and cooling).

If the ToU retail product rewards off peak usage with a discount, and the consumer follows this signal by charging their EV off-peak, but the product then balances this out by penalizing peak time usage (because the consumer still wants to cool their home when it's hot), the result is that the consumer will not be likely to see a significant benefit from the ToU product. They'll likely be better off on a flat tariff, where they'll see comparable annual cost, and significantly less seasonal volatility in their bills. Crucially - on a flat tariff like that they'll have no motivation to reduce their peak time usage.

Put another way- if we want the consumers of today, 96% of whom are accustomed to flat tariffs, to make the small effort required to charge their EVs at off-peak times instead of peak times, then we should reward that desired behaviour, without simultaneously seeking to punish them for heating or cooling their homes during the afternoon peaks.

We do not actually need a 'prices for devices' approach to make this work. The EV charger does not need to be metered separately from the rest of the home, as contemplated in AEMOs recent rule change proposal[11]. What is required is that the consumer be kept front of mind when designing the network tariffs, which underpin the retail products.

The future-looking piece is that where the consumer has the capacity to vary the time at which they export (for example from a stationary battery, or an EV equipped for V2G), it will

[10] https://www.aer.gov.au/system/files/Understanding%20the%20impact%20of%20network%20tariff%20reform%20on%20retailers%20in%20SA%20and%20QLD.pdf

[11] https://www.aemc.gov.au/rule-changes/unlocking-CER-benefits-through-flexible-trading

be appropriate for the feed-in-tariff to vary. At its simplest, this could be a low feed-in-tariff rate in the middle of the day (reflecting the low value to the system of energy at that time), and a higher feed-in-tariff rate at peak time. This is considered in the 'Residential Electrify Export' (REE) tariff, described in section 6.3.1 of Part B of the draft proposal. It's a very good start, but is flawed in the detail.

As we have already seen, the vast majority of residential consumers in South Australia do not elect to take on a ToU retail product. For successful V2G integration at scale, this will need to change. The retail products associated with V2G will need to be attractive. One of the challenges in the proposed implementation of the Residential Electrify Export tariff as described by SAPN is that while it's proposed that the consumer can be rewarded for export at 5pm to 9pm from November to March (specific value in c/kWh not yet defined, but could be about 14c/kWh, per the existing RELE2W tariff), the Residential Electrify Export tariff can only be partnered with the Residential Electrify Consumption tariff, which currently imposes a 29c/kWh network cost for consumption at peak time year round. This could reasonably be expected to turn into a 70-80c/kWh retail price to the consumer for any load they present to the grid in the 5pm to 9pm window.

The consumer who is at home with the car from 5pm to 9pm, November to March, able to run their home from their car (to avoid the punishment associated with grid consumption at that time), and in addition is able export to the grid (to derive the reward available), is likely to benefit to some degree, depending on the relative scale of the export tariff offered…. but if the car isn't discharging at the home during that window, while there is electrical load present from other equipment - for example, one parent is at home making dinner while the other has taken the car and their kid to an after school activity - then the consumer carries a stiff penalty for each kWh used for normal 5pm to 9pm day-to-day usage. And, for the majority of the year that isn't November to March, there's no significant feed-in tariff available to reward V2G export, but the price for electricity from the grid between the hours of 5pm and 9pm remains high… so, the consumer will need to use their V2G capability every day to avoid that penalty, but will see significantly less benefit.

A better approach to encourage V2G participation would be for the tariff structure to offer the high feed-in tariff to the network between 5pm and 9pm, without linking it to a significant penalty for consumption from the grid during those hours. The relative c/kWh levels will need attention too – if the reward on offer is small, consumers will be far less likely to invest in the hardware necessary to participate.

In terms of the potential scale of the missed opportunity here: SAPN predict 260,000 EVs on the road in South Australia by 2030. If the SAPN tariff structures and assignment policies don't support the development of retail products that make V2G attractive, then we'll see limited uptake at scale of V2G in South Australia. However, if we get it right…. assume 20% of those 260,000 predicted EVs doing V2G in 2030. At 5kW export each, that's about 260MW…. enough to serve ~8% of the South Australian electricity system's peak demand, deliverable when the system is under maximum pressure, and sustainable for the entire evening. This will be more than enough to offset any EV charging that might be happening among the other 80% of vehicles, and also make the difference in keeping the lights on in the state on hot afternoons.

To simplify:

- Put the stick away.
- Bring out the carrots.
- The consumer already knows how to walk away from the stick.

Visibility of network information

We note that the SAPN proposal contains a $20m 'innovation fund', to be used for projects as yet not fully defined.

We note that per our recent State of EVs publication, visibility of network capacity data, at a granular level, is key to the acceleration of rollout of public EV charging equipment.

Essential Energy is best in class at this in Australia, as described in on page 22 of our report[12]

We note that SAPN currently make capacity information at a feeder level available to the public[13]. We ask SAPN to get more granular, down to the level of pole and pad mounted transformers, particularly where they are >300kVA in size.

It would be appropriate for a portion of the $20m innovation fund to be used for this purpose, as noted in section 10.4.1 of Part A for the proposal: "for example in obtaining information on the capacity of our network in a dynamic way". For example, instrumentation of transformers, to enable visibility of this data, could be a viable use of funds with this goal.

The availability of this information enables faster and more efficient site selection for parties planning to deploy electrical equipment like public EV chargers and will also improve operational efficiency for SAPN when processing new connection applications. We expand on this in our response to the recent ESB/AER work on network visibility, here:

https://electricvehiclecouncil.com.au/submissions/evc-response-to-esb-aer-benefits-of-increased-visibility-of-networks-consultation-paper/

[12] https://electricvehiclecouncil.com.au/wp-content/uploads/2023/07/State-of-EVs_July-2023_.pdf

[13] https://www.sapowernetworks.com.au/data/315234/new-network-visualisation-portal-launched/