Submission to AEMC, on the Draft rule determination, Governance of distributed energy resources technical standards,16 December 2021, Reference: ERC0319

January 2022

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Introduction

On 21 September 2020, the AEMC received a rule change request from Dr Kerry Schott AO. The request seeks to introduce new governance arrangements for setting technical standards for distributed energy resources (DER) in the national electricity market (NEM).

https://www.aemc.gov.au/sites/default/files/documents/210806_erc0319_rrc0040_rule_change_request_pending.pdf

This new rule change request would create a new technical standards framework across all DER, which is considered to include EVSE (EV charging equipment), and could potentially include charging orchestration services as well.

The AEMC draft determination, released on 16 December 2021, was to not make a rule in this respect:

https://www.aemc.gov.au/sites/default/files/2021-12/211213_erc0319_draft_determination.pdf

The Electric Vehicle Council (EVC) is the peak body in Australia representing the interests of manufacturers and suppliers of EVSE, software service providers in the field of EV charging orchestration, and Electric Vehicle manufacturers. We also have strong membership amongst energy market participants, including retailers, DNSP, TNSP, and generators.

The EVC has a very strong interest in ensuring that uptake of electric vehicles in Australia is beneficial to the overall energy system.

EVC position on the AEMC draft determination

With respect to all DER matters relating to electric vehicles and their charging infrastructure, the EVC agrees with the AEMC, in that the proposal set out in the rule change request would not contribute to the achievement of the NEO or NERO.

In particular, we would echo and endorse the sentiment in sections 3.2.2 and 3.2.3 of the draft determination.

> "3.2.2 Avoid duplicating existing arrangements and initiatives"
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> "Consistent with limiting the regulatory burden for market participants, the Commission wants to avoid duplicating work already underway by other organisations. By using existing powers rather than introducing bespoke governance arrangements through new rules, the Commission considers that it would be able to fully address the issues raised by the rule change request. In addition, the flexibility of the draft rule determination approach means the AEMC would not be bound by the NER to taking certain actions on an ongoing basis if such an approach duplicates work for market bodies and stakeholders participating in these reform processes."
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> "3.2.3 Significant benefit from flexibily [sic] supporting DER technical integration"
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> "In addition to increased policy uncertainty, there is increased uncertainty about market developments with respect to new DER capacity. While the strong growth in new capacity is continuing as forecast (see section 1.1), the full grid and consumer implications from this transition (and what policy reforms are needed in response) are still being collectively considered by the AEMC and others. This increased uncertainty does not diminish the need for action. However, it likely makes it less preferable for the AEMC to prescribe how the integration of DER in the NEM should be managed."

The EV transition – general grid considerations

The transition of the Australian road vehicle fleet from petrol and diesel to electric is likely to result in a ~40% increase in overall electrical energy requirement, following a sigmoid curve over a period of at least 30 years. Many parties have done modelling to this effect, with various tolerances around the energy and timing.

Billions of dollars will need to be spent on new generation assets to produce the additional electrical energy required, paid for by the increased demand for electrical energy. Billions of dollars will also need to be spent on transmission infrastructure, to connect these new generation sources to consumers. This is not avoidable, but is also not an issue, because the cost will be met through the transition of consumer spending on petrol and diesel to consumer spending on electricity.

At a distribution network level, to the extent that the recharging of these vehicles is additive to peak demand at any point in the network, investment will be required. The corollary is also true – to the extent that EV charging occurs at non-peak times, network asset utilisation will improve, delivering benefits to all consumers.

A future where the bulk of EV charging happens during the middle of the day (characterised by excess solar generation), and overnight (characterised by excess wind generation), with negligible EV charging occurring in the typical peak period of ~3pm to ~10pm, is one where the transition to EVs exerts downward pressure on electricity pricing for everyone. By contrast, a future where the bulk of EV charging happens at 5-7pm when consumers get home from work will result in increased electricity prices for everyone.

The question at hand is to determine the most appropriate methods by which to achieve a future state where, to the extent possible, EV charging occurs during times of low demand.

The EV transition – Specific considerations with respect to DER

Known solution pathways for EV charging as DER

Substantial work has been undertaken globally and locally, looking at pathways to achieve the desired outcome stated above.

It is already clear that there are multiple pathways which have the potential to deliver the desired outcomes, for example:

- ToU pricing and solar feed-in-tariff rate setting. It's very easy for drivers to shift their EV-related energy use temporally for the benefit of the electrical network, if they have an incentive to do so. Local research form top-tier universities[1] indicates that it is highly likely to be highly effective at addressing the issues of both peak demand and minimum demand.

- Messaging to consumers during times of peak demand, to request behaviour change. Schemes of this nature have been running successfully since 2015 in Australia and have scaled up across tens of thousands of consumers in the last few years. Examples include United Energy's 'Summer Saver', Powershop's 'Curb your Power', and Energy Australia's 'Power Response'.

- Direct-to-vehicle orchestration. The vehicle is a smart device too. An orchestration solution that reaches out to the vehicle to secure changed charging behaviour may well prove superior to orchestration of the EV chargers, because it will work in cases where the vehicle is connected to a standard powerpoint.

- OCPP-based orchestration. OCPP is the de-facto communications standard used by EV chargers globally. It has the capacity to deliver all the DRM modes applicable to capabilities that a DER scheme covering EV charging would reasonably seek to deliver if centralised orchestration proves to be the best way to go.

The first two pathways are already in place in the market at scale, and the second two are the subject of multiple ARENA funded trials. None of these approaches require the development of new technical standards; they require the effective application in the market of existing technical standards.

In terms of technical standards, industry participants are highly engaged, producing work like this in the domain of technical standards underpinning these solution pathways:

https://aemo.com.au/-/media/files/stakeholder_consultation/working_groups/der-program/deip-ev/2021/deip-vgi-standards-report.pdf?la=en

[1] https://www.researchgate.net/publication/355444278_Electric_Vehicle_Charging_Consumer_Survey_Insights_Report

Local vs international standards for different types of DER

In some other forms of DER (such as rooftop solar) Australia is a global market leader. We have jurisdictions such as South Australia, where we are meeting the grid-related challenges associated with massive roof-top solar uptake first in the world, so it is completely appropriate for us lead on the standards development and practices associated with that class of equipment.

In EV, however, Australia is a laggard with respect to uptake, running last in the OECD. Attempts on our part to set our own unique DER technical standards in this space are highly unlikely to be effective, because the global standards to which manufacturers of vehicles and charging equipment are designing will be dictated by the more advanced markets.

Importantly, those other overseas jurisdictions with higher EV uptake are highly likely to create solutions that will work in concert with overseas manufactured EVs, and overseas manufactured EVSE, and are fit for adoption in Australia without modification.

As an example, OCPP is the de facto global standard for remote control of EV charging equipment. It was initiated in 2009 in the Netherlands and is now at a point where it is actively in use on hundreds of thousands of pieces of charging equipment globally. OCPP is readily available as an option on EVSE designed for installation in the home, available for purchase in Australia today. It is eminently suitable for use as part of a DER orchestration approach involving EVSE, and widely is available today.

By comparison, the last local effort to create a demand response standard applicable to EVs in Australia was draft AS4755.3.4 in 2012-2013. This standard would have required EVSE hardware to be built to a unique physical technical standard, in order to enable DRED connectivity. It was withdrawn following the first round of public comment and is considered unsuitable for the task by industry experts and market participants.

Were we to head down a pathway of creating a unique Australian standard in this space, it would take at minimum several years to result in a physical product offering to market and it is doubtful that the majority of global manufacturers of EVSE would produce an offering for such a small market, given the consumer has the alternative available of the standard GPO. This would result in:

- Higher costs for consumers electing to install EVSE,
- Reduced competition amongst organisations supplying EVSE,
- A higher proportion of consumers charging using existing uncontrolled GPOs, and
- Australia losing the ability to adopt best practice global solutions based on international standards, as and when they emerge.

The existing Standards Australia framework facilitates close collaboration with international standards bodies, which is going to be absolutely critical for Australia in the EV space. The adoption of international standards where possible is long standing federal government policy and a key element of the Standards Australia process. It was not clear to the EVC from the rule change request that this priority is adequately reflected in the proposed governance arrangements.

Timing of the uptake of EVs, and co-incidence of demand

As noted above, the long run impact of EVs will be such that total energy requirements will be significant.

This said, near term impacts on the grid will be negligible, because uptake will follow a sigmoid curve, and is limited by the global availability of the vehicles. Australia installs on the order of 900,000 split system air conditioning units each year, which present load in a highly co-incident manner during heatwaves. By comparison, annual sales of EVs are expected to reach 20,000 units this year, most of which recharge at 1.8kW at home from a GPO.

Adequate large scale analysis of temporal spread of the load presented in Australian homes by these vehicles has not been done at this stage. Small-scale surveys and trials tend to indicate a significant degree of self-management of timing of EV charging, showing consumers taking advantage of ultra-low-cost ToU tariffs, and to maximise self-consumption of solar.

The EVC is working to close this particular knowledge gap this year.

This essentially means that we do not need to rush the creation of standards with respect to EV as a DER. We have time in hand to use existing robust processes around the creation of technical standards, and adopt global best practice solutions as and when they are proven to deliver good consumer outcomes.

Conclusion

The EVC considers that the existing technical standards governance arrangements are complex, but that the proposed rule change would not improve matters.

Maximum consumer benefit in the EV space is likely to be achieved through the adoption of proven international solutions.

One of the few benefits of being the slowest country in the OECD to uptake EVs is that we have time in hand to observe what works in other countries, and when it comes time to adopt standards from those jurisdictions without modification, the process can be relatively fast.

The key risk we observe here is an inclination on the part of some entities to regulate excessively, well in advance of an actual need for regulation, and without attempting to align with international standards and global best practice.