



Response to the Energy Security Board: Electric Vehicle Smart Charging Issues Paper

The Battery Storage and Grid Integration Program (BSGIP) welcomes the opportunity to provide input on the Energy Security Board (ESB)'s Electric Vehicle Smart Charging Issues Paper.

The Battery Storage and Grid Integration Program is a multi-disciplinary, industry-focused research and development program based at The Australian National University. We take a holistic, socio-techno-economic approach to our work in the energy system. In this context, our submission provides recommendations from all three perspectives that we believe will create an energy future that better serves all Australians.

In writing this submission we have drawn on experience from some our recent research and development projects on the integration of electric vehicles (EVs) and the related charging infrastructure into the National Electricity Market (NEM), including [evolve](#) (smart software for 21st century electricity systems), and [Realising Electric Vehicle-to-grid Services](#) (REVS). Three themes in particular stand out as essential considerations in response to the Issues Paper:

1. Incorporating existing expertise and evidence, and leveraging existing trials and demonstrations to test key concepts
2. Ensuring all people, their values and their aspirations are heard as part of any reforms
3. Ensuring coordination, particularly with the transport sector.

1. Incorporate existing expertise, evidence, trials and demonstrations

Electric vehicles are a mature and rapidly expanding technology, and many groups have undertaken extensive work on EV integration into socio-techno-economic systems. Through the REVS project in particular, BSGIP has published significant detail on the technical capabilities required of EV chargers, appropriate regulation, unlocking economic and grid benefits, and sociotechnical dynamics considering the views of technology developers and different user groups. These reports are open-source and available from the ARENA project website¹, and include a lessons learnt report² dedicated to the challenges relating to certification of a vehicle-to-grid EV charger against the AS/NZS 4777.2:2020 standard.

Similarly, BSGIP's evolve project developed dynamic operating envelopes to demonstrate cost-effective ways to increase network hosting capacity through the orchestration and co-ordination of smart software rather than additional infrastructure. The network capacity unlocked by this project will allow customers to access new opportunities to generate, store, share and trade their energy, while maintaining safe network operating limits. Ultimately evolve will underpin how we design, build and operate a modern, customer-centric electricity system.

The ESB's analysis of electric vehicle smart charging issues should be informed through broadly leveraging such trials and demonstrations, which are useful to reduce risks and as a means of building stakeholder confidence. However, while trials allow a "test drive" of the proposed future at lower risk, they can only deliver value if their outcomes are actioned. The ESB has engaged with trial outcomes

¹ <https://arena.gov.au/knowledge-bank/?keywords=Realising+Electric+Vehicle-to-Grid+Services>

² <https://arena.gov.au/assets/2022/05/realising-electric-vehicle-to-grid-services-lessons-learnt-2.pdf>

through discussion of diverse consumer values in chapter 3.1.2 of the Issues Paper, but the related question 8 demonstrates that consideration of these values has not been extensive. BSGIP's research in the REVS trial³ showed that people expect their transport needs are more important than energy systems, which means that discussing mandates without an understanding of how smart charging is to be implemented is unlikely to be constructive at this stage. These reforms must start with the consumer and their needs. We recommend the ESB works more closely with trial projects and provides a formal mechanism for capturing their outcomes to inform this current process.

We also encourage the ESB to refer to previous consultation and evidence on this issue, such as the COAG Energy Council Equipment Energy Efficiency (E3) committee's program work on demand response. A regulatory impact statement process for smart appliances, including EV chargers, was completed in 2019 and received many consultation responses.⁴ This process encountered significant challenges and could provide valuable insights for the ESB work on similar issues.

2. Engage and listen

Electric vehicles are, as their basis, a consumer product. EVs are purchased for the primary purpose of providing mobility - a service that has not historically been associated with electricity and billing. Driving EVs and charging are new experiences for most people, who will require information, support and time to adapt. EVs will also often be the first flexible electricity asset that a customer has owned.

In Australia, cars hold strong symbolic values for many people for whom a vehicle is more than just about 'getting from A to B', but also about status, group-identity, autonomy and control of life options. Any reforms will need to ensure they open the door for retailers to engage in new conversations about algorithmically optimised energy use, ancillary services and mobility with customers. Building these relationships will require considerable engagement, experimentation, and agility. Many of the fundamental questions about, and potential framings of, EV customers' perspectives on EV charging management are yet to be pursued. This is particularly critical to the framing of who has what rights to control EV charging.

The ESB's customer insights research has found that consumers who already have DER assets are not necessarily motivated to change the way they use them for the rewards that are on offer, and that access, understanding and trust are material barriers for consumers who are yet to engage with new products and services. This research also established that we are still learning about EV owners' willingness to manage charging flexibly in response to price and other signals. Some consumers may prefer the technology to manage this flexibility, others may not. Exploring, with consumers themselves, how to address these issues will be critical to the success of any reforms.

The current consultation process being undertaken by the ESB is public, meaning in theory that anyone can submit a response. However, we feel that the current process may be less than accessible for most Australian consumers. Engaging with these processes requires a substantial investment of time and significant technical expertise. There are relatively few tools or forums available for people to build sufficient expertise to engage with the process and provide meaningful feedback on such a critical issue. Realistically, the expectation that customers should build this expertise to have their voices heard is unfair. We therefore recommend the ESB engage more deeply with people and communities on the proposed changes, and that this engagement should empower people to contribute specifically towards shaping the reforms.

³ <https://arena.gov.au/assets/2022/08/final-social-report-revs-project.pdf>

⁴ <https://www.energyrating.gov.au/document/regulation-impact-statement-decision-smart-demand-response-capabilities-selected-appliances>

3. Is this the right vehicle?

It is clear that the energy sector is planning toward integration of EVs and there are various process underway, but coordination of this effort and across other related sectors – particularly transport – will be key to a successful transition. The sectors need focus and a plan in order to transition well and produce good outcomes for consumers, the grid, and the Australian economy.

The ESB's work has already shown that Australia is already creating a federated regulatory and incentive system in the absence of a national framework and plan. There is a danger that this approach could result in inconsistent standards and policies, which would be detrimental to the transition and consumer outcomes, as well as grid integration. BSGIP's work has demonstrated that co-ordination at this level is key.⁵ EV policy spans many portfolios including transport, infrastructure, energy, planning, environment and climate change, across states territories and national governments. This makes coordination difficult, and creates the risk of policies undermining each other.

Some of the matters raised in the Issues Paper remain under discussion in this context, and it is therefore perhaps not the right moment to set standards. The ESB customer insights research has established that we need to take care about our assumptions about EV charging preferences and behaviour and draw on evidence when designing and implementing reforms, testing and learning where there are gaps in our knowledge.

As such, we recommend a formal process to establish a better understanding of who is using EVs, why, and how, and how they are likely to be used in the future. This includes integration with heavy vehicles, fleets, and buses. Where there are large loads anticipated – such as on trucking routes – this will require further consideration. In this context, there is a question about whether this process would be better co-ordinated by the relevant Departments who hold critical data and are experienced at collaborating on such reforms.

Conclusion:

Overall this work captures many important issues, and will likely prompt informative responses from established stakeholders in the energy sector. However, this discussion should be further informed by existing knowledge and evidence, and perspectives from diverse consumers and affected industry and policy sectors.

Further reading:

- [Crossing sectors: a how-to guide for putting V2G into practice](#). Knowledge Sharing report for ARENA as part of the Realising Electric Vehicle-to-grid Services (REVS) project. June 2022. Kathryn Lucas-Healey, Laura Jones, Md Mejbaul Haque and Bjorn Sturmberg
- [Final Social Report](#). Knowledge Sharing report for ARENA as part of the Realising Electric Vehicle-to-grid Services (REVS) project. June 2022. Kathryn Lucas-Healey, Laura Jones and Bjorn Sturmberg.
- [Grid performance of a V2G capable EV charger: a case study](#). Knowledge Sharing report for ARENA as part of the Realising Electric Vehicle-to-grid Services (REVS) project. June 2022. Md Mejbaul Haque, Laura Jones, Kathryn Lucas-Healey, Bjorn Sturmberg
- [Lesson learnt 2. Certification and Performance of Charger against AS4777.2:2022 Standard: insights from the Realising Electric Vehicle-to-grid Services \(REVS\) trial](#). May 2022. Md Mejbaul Haque, Laura Jones, Bjorn Sturmberg and Kathryn Lucas-Healey.
- [FACTS: A Framework for an Australian Clean Transport Strategy](#). May 2022. Developed by 18 clean transport and energy experts including Dr Bjorn Sturmberg.

⁵ <https://theconversation.com/check-your-mirrors-3-things-rooftop-solar-can-teach-us-about-australias-electric-car-rollout-162085>