AUSTRALIAN ENERGY COUNCIL

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AER Consultation Paper – Assessing DER integration expenditure

The Australian Energy Council welcomes the opportunity to make a submission on the AER Consultation Paper – Assessing DER integration expenditure.

The Australian Energy Council (AEC) is the industry body representing 23 electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. These businesses collectively generate the overwhelming majority of electricity in Australia and sell gas and electricity to over 10 million homes and businesses.

Expenditure Forecast Assessment

Question i – Are our assessment techniques outlined in our Expenditure Forecast Assessment Guideline (the EFA Guideline) sufficient to assess DER integration expenditure?

The EFA Guideline was developed for assets that have a significantly longer life than DER being installed to accommodate forecast growth in demand and consumption that may not have been sustained. Air conditioning was a significant driver of capex in the 80's and 90's. According to the US Department of Energy, today's best air conditioners use 30% to 50% less energy to produce the same amount of cooling as air conditioners made in the mid 1970s.[1] Even if an air conditioner is only 10 years old, savings of 20% to 40% can be achieved by replacing it with a newer, more efficient model.[2]

Whilst much attention is being paid to the observed price per watt of PV[3] and the observed and forecast prices of lithium batteries as a proxy to their installation rates, these are short life assets (compared to historical distribution network assets) that also suffer comparatively rapid decline in their efficiency over that shorter lifetime. Tests by the German Fraunhofer Institute for Solar Energy Systems[4] showed that some solar panels can lose more than 30% of their rated power through this effect and as much as 90% in extreme cases.[5] This is in excess of the generally

[1] https://www.energy.gov/energysaver/central-air-conditioning
[2] ibid
[3] AER Consultation Paper – Assessing DER integration expenditure, Appendix A
[4] https://www.ise.fraunhofer.de/en.html
[5] LG Energy - How do solar panels lose efficiency? https://www.lgenergy.com.au/faq/solar-panels/when-solar-panels-loose-efficiency-how-does-that-happen

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acknowledged 0.7 to 1% pa decline, though even that lower rate leads to a 20% change over 20 to 25 years.[6]

Some energy retailers privately estimate that around one million, or 30%, of the small solar PV suite is now without warranty protection, a result of the "phoenix" activity of suppliers and installers. Whether this leads to the increased incidence of failed inverters not being replaced because of the cost to small residential and small business customers remains to be seen.

Similarly batteries will experience deterioration over time. Their nameplate rating does not address that, for example, a 10 KWh battery bank with a stated end of life retained capacity of 70% will be able to store at least 7 KWh of energy by the end of its warranty period (10 years was the maximum warranty period identified[7]) or that its probable functioning life is 15 years.[8] This is considerably shorter than historical assets contemplated by the EFA guideline.

Predicting energy outcomes even in the short term is notoriously difficult[9]. Long life distribution assets will always struggle for fit in any overlay with short(er) life DER assets. Advance in technology is unpredictable, as is consumer behaviour.

Should customers endure higher regulated costs over a shorter period of time to accommodate forecast DER expenditure? And will customers replace their ageing solar and storage assets, or will the forecast consumer led DER flood become a trickle? In de-risking the cost to consumers of DER integration the AER's consultation is timely.

Question ii – What form of guidance should we include to clarify how our assessment techniques apply to DER integration expenditure? For example, should we update the EFA Guideline to be more prescriptive, or only include principles to allow for greater flexibility in our assessment and information requirements as DER integration matures?

The AER already has considerable flexibility in how it assesses expenditure. Importantly, the AER does not have to accept that any NSP proposal is the most significant input into their decisions[10]. To the extent that further principles are required, these could be linked to requirements that DER integration is linked to economically efficient alternatives to standard grid supply; that appropriate disincentives to inefficient DER are apparent in the networks standard DER connection policies and connection agreements.[11] As the DER market and technologies mature, NSP's may need jurisdictional support in this regard. There is no point in developing the most efficient mechanism for catching your tail, if chasing your tail is utterly inefficient.

The existing EFA is not inconsistent with historical methods enabling conventional investment in the network. These investments saw an increase in the Regulated Asset Base (RAB) by over $40

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[6] ibid
[7] End of life retained capacity https://carbontrack.com.au/guides/energy-efficiency-guide/battery-storage/
[8] In the short research to identify battery life undertaken for this submission, not one website that was promoting the sale of domestic battery storage addressed battery life of their product in any way beyond the warranty period.
[9] McKinnon, *Moving the goal posts – what changed in the ESOO*, Energy Insider, September 2018 https://www.energycouncil.com.au/analysis/moving-the-goal-posts-what-changed-in-the-esoo/
[10] Expenditure Forecast Assessment Guideline 2013, Final Decision, Explanatory Statement p.41
[11] This needs to be considered carefully, as the potential to extort free services by the monopoly DNSP from the DER provider via the terms of the connection agreement is not an efficient outcome. See further comment in response to *Connection Agreements*.

billion since 2006, with no commensurate increase in demand through the grid.[12] The Grattan Institute has estimated that $20 billion of this expenditure was wasteful overinvestment.[13]

In our view the EFA must include principles to allow for greater flexibility and information requirements as DER integration matures.

Question 1 – Information provision – What information is reasonable and necessary in identifying and evidencing the impact of DER on the demand for standard control services and hence on maintaining the quality, reliability or security of supply of standard control services?

In short the answer to this is that evidence is required that proves the case being made by the NSP. We accept that this is a vexing question for regulators, who face the obvious information asymmetry problem and the networks incentives to maximise its own position.

The AER has powers to gather the information it needs to fulfil its functions and powers.[14] Under the national energy laws, the AER can use its powers to obtain written information and documents if "the AER has reason to believe that a person is capable of providing information or producing a document that the AER requires for the performance or exercise of a function or power conferred on it" under the national energy laws and rules.

The impact of DER integration is adequately covered by and not materially different enough to require discrete changes to information gathering powers.

Question 2 – Options analysis – What range of options should DNSPs consider for DER related investments? Does the Regulatory Investment Test – Distribution provide the appropriate starting point for this analysis?

The AEC has long sought changes to Regulatory Investment Tests (RIT) to ensure competitive non-network solutions are considered for the widest practicable range of network investment decisions.

To maximise the scope for independent competitive providers to supply network support that forms the basis of standard control services these competitive providers need to be exposed to the information and price signals that indicate where and when network support services are most valuable. This does not occur now, whereby the high threshold value of the RIT–D compromises both allocative efficiency and dynamic efficiency. Part of the solution is that the threshold be reduced from $5 million for distribution network investments.[15]

Question 3 – Sampling and modelling – Electricity networks have utilised sampling and modelling techniques to forecast energy demand and consumption for decades. These processes have proven affective for large cohorts of consumers where diversified behaviours can be predicted with sufficient accuracy. Is it reasonable to assume that sampling and modelling techniques will play a part in developing dynamic models of the electricity networks?

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[12] Ross Garnaut, Superpower, Latrobe University Press 2019, p.95

[13] Ibid

[14] The relevant provisions are replicated in each of the national energy laws: s. 28 of the NEL; s. 42 of the NGL; s. 206 of the NERL.

[15] The AEC has contended the threshold must be reduced from $5 million for distribution network investments to $50,000. *Amendments to Chapters 5, 6, 6A and 7 of the National Electricity Rules In the implementation of Demand Response and Network Support Services. AEC Rule Change Proposal 13 October 2016.*

It is reasonable to assume that sampling and modelling techniques will play a part in the development of dynamic models. It is not reasonable to assume that all outcomes will be predictable and accurate, or will determine whether a particular independent variable *really* affects the dependent variable, and to estimate the magnitude of that effect.

For example, over voltage is a common DER integration effect that has been ascribed to solar PV penetration, inverter performance and insufficiently rigorous standards. Overvoltage can be mitigated by a range of technical solutions, and emergent form of which is dynamic tap capability on distribution transformers by way of example. Installing such distribution transformers may be a way that future DER integration costs are created.

Early studies by retailers in VPP trials have identified overvoltage in summer periods in areas where there is high solar PV penetration. This may lead to the ready conclusion that solar PV and overvoltage are cause and effect. What has been surprising is that there is no material difference between voltage levels on a winter day in the same sample. Overvoltage might therefore be a function of another cause. All that has happened is that we have become aware of overvoltage because for the first time it has created a consumer outcome (tripping inverters). Prior, no one noticed. Add to this the problem that some of the distribution transformers are of a specification and type where a tap change cannot be done. This is then not a DER integration effect, but simply that an NSP that has been supplying off spec voltage.

Question 4 – Non-network options – Distributed energy resources are, by definition, located at the end of the electricity network. Typically networks have less visibility of this part of the network. What approaches or information is reasonable to assess whether DNSPs have considered purchasing the necessary information from metering or DER data providers rather than building their own assets and systems?

Regulation hopes to replicate competitive outcomes. In doing so it hopes to achieve competitive type efficiencies. The AER also looks to open up markets to competition[16].

The original COAG Energy Council's rule change request (Metering Competition) identified that the previous regulatory framework in which the NSP performed the function of MP, MC and often MDP, in spite of the benefits advanced meters can offer, encouraged the continued installation of meters with only limited functionality. Under metering competition the necessary information is or can be made available from advanced meter services in the market; at a price. The threshold test is not whether or not NSP's are prepared to pay for something that they used to get for "free".[17] These services are not "free" to consumers, Victoria's electricity consumers have paid an estimated $2.239 billion for the information and metering data from metering services, including the rollout and connection of smart meters.[18]

The AER could reasonably contemplate assets and systems for modelling, but not for the metering assets nor the metering data itself. Metering and meter data should not be duplicated.

Question 5 – Policy and standards – The optimisation of DER can be improved through many different approaches. Factors such as tariff reform, connection standards, technical standards, energy efficiency standards, etc. can greatly impact the way that DER operates on the network and

[16] https://www.aer.gov.au/networks-pipelines/our-role-in-networks
[17] It was always at the customers expense.
[18] https://www.audit.vic.gov.au/report/realising-benefits-smart-meters

impact on network performance. How should these options be integrated with the development of network DER proposals?

Tariff reform, connection standards, technical standards, and energy efficiency standards could impact the way that DER operates on the network and impact on network performance, though this impact is likely to be low in the first instance.

Tariff reform

In energy, the cost reflective pricing principle that underpins tariff reform most often loses its appeal where it stands in opposition to the ability to pay principle. The ability to pay principle considers that those who have the means should share more of the burden, and particularly the burden of essential services. This is all an adjunct to the affordability principle, for the ability to afford those items essential for a reasonable standard of living. The ability to pay principle underpins why we have concessions, and why we have retailer hardship policies and it is why the costs of those programs are spread across all customers (or taxpayers). It's also a large part of why we have postage stamp network pricing, whereby those in concentrated network zones effectively cross subsidise those who are in sparsely populated regions. This conflict of principles is why consumer buy in to cost reflective pricing products is so low.[19] And the conflict explains, in practice, why cost reflectivity is such a difficult principle to implement. There is not Australian evidence to date that tariff reform will have any determining effect in mass markets.

Notwithstanding any difficulty in reconciling tariff objectives, the work in progress to develop tariff reform programs is still important and should continue. For example, if tariffs provide incentives to fill batteries when usage of the grid is low, or when energy prices are low, this will reduce costs and help stabilise the system.[20] We reiterate however that tariffs are unlikely to be a stand-alone solution, and tariffs and technical standards need to align with delivering this capability, and not with theoretical ideas about time of use pricing. These standards are being tested to some extent now by AGL[21] and Simply Energy[22] with Virtual Power Plant (VPP) Projects, where customers' energy storage systems are managed, delivering an aggregate response that is sufficiently large to deliver a potential grid scale benefit.

Connection Standards

Connection Standards are potentially the most effective DER optimisation tool. They are also the tool most open to abuse, particularly where standard form contracts, such as DNSP small customer connection agreements, fail to take account of the relative bargaining power of the parties and their ability to negotiate terms.

This abuse is contemplated in Australian Consumer Law through unfair contract terms. Unfair contract terms are terms that:

1. Cause a significant imbalance between the parties' rights and obligations;
2. Are not reasonably necessary to protect the legitimate interests of the party advantaged by the term; and
3. Cause detriment to a party if relied upon.

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[19] See also the PIAC Response to the AEMC's approach paper on the Electricity Network Economic Regulatory Framework Review February 2017, p 4 https://www.aemc.gov.au/sites/default/files/content/4a3bd520-2894-495e-a01e-bf69ee38e346/MarketReview-Submission-EPR0050-Public-Interest-Advocacy-Centre-1702.pdf

[20] Ross Garnaut, *Superpower*, Latrobe University Press 2019, p.134

[21] In conjunction with Tesla, SolarEdge and LG Chem

[22] https://www.simplyenergy.com.au/energy-solutions/battery-storage/south-australian-virtual-power-plant-vpp

The ACCC has made it clear it will pursue businesses with standard form contracts containing unfair terms.[23] In particular, standard form contracts should look to avoid terms providing only one party a right. Customer connection services must be provided in accordance with the relevant contract requirements prescribed under the NERL, NERR, National Electricity Rules (NER) and National Gas Rules.

Above all, it is not appropriate for networks to control DER assets through connection agreements, thereby circumventing or terminating the opportunity for market-based solutions to the DER optimization challenge that may deliver more efficient outcomes.

Technical Standards

On 22 November 2019, the COAG Energy Council agreed to introduce demand response capability requirements for air conditioners, electric storage water heaters (resistive), devices controlling swimming pool pump units, and electric vehicle charger/discharger controllers. Further work is clearly required in this regard.[24]

Demand response capability is also logically required. Estimates are that a 10% uptake of electric vehicles could generate major problems for grid stability and require large investment in the distribution network to fix.[25] Garnaut contends that with effective incentives to keep recharging ouside peak demand periods, an 80% uptake would be plausible without new investment to keep the grid stable.[26] History does not give us confidence in the price signal alone to change consumer usage patterns longer term, nor even that the price signal can be passed through to end users[27]. However technical standards that enable charging a times of low demand and discharging at periods of high demand, as well as appropriately aligned tariffs to reward customers for that outcome, can form part of a portfolio approach.

Question 6 - Cost benefit analysis – Project justifications will require detailed analysis on the costs and benefits of each option. Many of these benefits may be external to the DNSP's cost base, and may accrue directly to DER users. What level of analysis is required? 8-23 AER Consultation Paper – Assessing DER integration expenditure

We are unsure as to whether the regulator (or even the DNSPs themselves) actually have robust enough information to make really good decisions about efficient expenditure given that this area is probably subject to greater levels of uncertainty than traditional network approaches, which has

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[23] ACCC, *Unfair contract terms, Industry review outcomes*, March 2013 https://www.accc.gov.au/system/files/Unfair%20Contract%20Terms%20-%20Industry%20Report.pdf

[24] It should be noted here that the Office of Best Practice Regulation (OPBR) assessed the level of analysis in the Regulatory Impact Statement prepared with this proposal was not adequate nor commensurate with the potential economic and social impacts. As the decision to introduce demand response capability requirements for selected appliances was based on this draft Decision RIS, the Energy Council is in the OPBRs assessment non-compliant with the COAG best practice regulation requirements. . https://ris.pmc.gov.au/2019/11/26/smart-demand-response-capabilities-selected-appliances

[25] Marcus Brazil, Australia's Electricity Grid Can Easily Support Electric Cars If We Get Smart, *The Conversation* 12 April 2019

[26] Ross Garnaut, *Superpower*, Latrobe University Press 2019, p.135

[27] Advanced Metering Infrastructure (AMI Tariffs) Order in Council, Victoria, 2013. As amended 2015, 2016 https://www.aer.gov.au/system/files/Department%20of%20Economic%20Development%2C%20Jobs%2C%20Transport%20and%20Resources%20%20-%20Advanced%20Metering%20Infrastructure%20%28AMI%20Tariffs%20Order%29%20-%2014%20April%202016.pdf

not necessarily been that accurate in any case. Improving the quality of information is critical. Further, regulators should acknowledge that the increased risk profile of expenditure under uncertainty requires shifting the method towards facilitating market-based approaches over regulated approaches.

Question 7 – Customer Benefit – With DER being able to provide services across the electricity supply chain, how should DNSPs identify and value customer benefits? These benefits can include reliability outcomes, increased export potential, greater access to energy markets, access to network support services, etc. Should a common approach to valuing consumer exported electricity be established?

Rewarding private unregulated investment that adds value to the network has a number of proponents.[28] Valuing that benefit provided to the regulated system is also addressed by Garnaut, suggesting that it should be rewarded as if it were an increase in the RAB in the ownership of the unregulated investor.[29] This may be a useful proxy for valuing the benefits of network support, consistent with the way Feed in Tariffs (FiT's) generally reflect the avoided cost to retailers of energy that would otherwise be bought from the wholesale market, along with the avoided social cost of carbon attributable to a reduction in air pollution due to the energy exported by solar panels.[30]

Question 8 – Options value – Noting the technological rate of change and the typical asset life of 65 years of many network assets, it is important to test whether current research could provide a more efficient option in the near future. Should an assessment of emerging alternative approaches be a requirement for DER forecast expenditure? Should there be an 'options value' placed on this?

There is a high probability that long lived traditional network assets will not see an increase in their value as a function of DER, given that emerging technology is likely to, and to some extent can already, provide a more efficient option. If an options value is placed on this, this might be comparable to revaluing the RAB, and historically the RAB cannot be revalued in a form that cannot be fully anticipated. Technology change would be difficult to anticipate. The AEC encourage the AER to consult further on this.

Question 9 – Shared learning and systems – The development of common platforms, communication standards and shared systems may reduce the overall cost and complexity of facilitating DER. Should DNSPs need to show how they have considered options that leverage shared learning, common standards and common systems to provide efficient solutions, and that they have consulted and implemented learnings from prior works and trials across the NEM?

Common platforms are important to efficiency. In most cases DNSP's will have similar needs for data acquisition, and having a similar structures for how data is acquired, processed, transferred and stored is more logically an advantage to regulated monopolies. It should certainly make life easier for other businesses having to interface directly with DNSP's to have common structures.

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[28] Clean Energy Council *CHARGING FORWARD: POLICY AND REGULATORY REFORMS TO UNLOCK THE POTENTIAL OF ENERGY STORAGE IN AUSTRALIA* May 2017, p.9, https://assets.cleanenergycouncil.org.au/documents/resources/reports/charging-forward-energy-storage-paper.pdf

[29] Ross Garnaut, *Superpower*, Latrobe University Press 2019, p.97

[30] This rate is currently set by the Victorian Government at 2.5 cents per kilowatt hour (c/kWh).reduction in greenhouse gas emissions. https://www.esc.vic.gov.au/electricity-and-gas/electricity-and-gas-tariffs-and-benchmarks/minimum-feed-tariff

DNSP's are not competitors with each other. In lieu of competition, well designed economic regulation that drives efficiency improvements influences the innovative process. In competitive environments innovators do not get rewarded for reinventing the wheel; nor should DNSP's. Therefore DNSPs should need to show that they have considered options that leverage shared learning, common standards and common systems to provide efficient solutions, and that they have consulted and implemented learnings from prior works and trials not only across the NEM, but globally.

Question 10 – Rail gauge outcomes – as a corollary to the above question, it will be increasingly important for the industry to work together to provide customer outcomes that are consistent across the NEM (or with international standards if applicable). What approaches or information is reasonable to show that any DNSP-specific communication protocols, interfaces, connection standards, etc. will not lead to increased cost and complexity for consumers and industry providers?

There is huge potential savings (and avoided costs and wider impacts) from global harmonisation of regulation for energy efficiency products.[31] There is also significant benefits to be gained by harmonising charging standards before the mass rollout of EV charging infrastructure.[32] Therefore by extension the adoption of globally recognised standards is in the best interests of consumers.

States and territories that adopt different standards from the largest markets will decrease the DER options available to consumers and will increase the costs. Costs should be factored into DER investment decisions to achieve the most efficient allocation of resources – consistent with competitive markets throughout the economy.[33] It should also be noted that DER's themselves may one day become portable, either between properties or even as a vehicle, so a uniform approach across all states and territories should ensure that they can continue to provide the range of services that they were designed for. Any deviation, by a DNSP from an already adopted, global standard should be open to independent review and scrutiny, so as to examine the market (both technology and energy) and network impact if the local standard was modified.

Any questions about our submission should be addressed to David Markham by email to [redacted] or by telephone on [redacted]

Yours sincerely,

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[31] European Commission *Savings and benefits of global regulations for energy efficient products*. September 2015, p.9
[32] Climateworks *The path forward for electric vehicles in Australia*, April 2016, p.21
[33] AEMC, *Economic regulatory framework review - 2019 Report*, 26 September 2019, p.8
https://www.aemc.gov.au/sites/default/files/2019-09/Final%20report%20-%20ENERFR%202019%20-%20EPR0068.PDF