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Australian Energy Regulator
Level 17, 2 Lonsdale St
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Dear Arek

Re: Assessing Distributed Energy Resources Integration Expenditure

AusNet Services welcomes the opportunity to provide feedback on the AER's consultation paper on assessing Distributed Energy Resources Integration Expenditure.

In August 2018, the Victorian Government announced its Solar Homes policy. This is a $1.2 billion program to encourage 650,000 Victorian home owners to install solar panels by providing a rebate on installation costs (per household) and low cost finance for the remaining costs.[1] We welcome this policy, as it represents a means to build on the 350,000 rooftop solar installations currently in Victoria and to keep pace with the roll out of these new technologies in Queensland and New South Wales. The early impact of the Solar Homes policy has been significant. We have observed a very large increase in solar connection applications this year. Since the go-live of our new solar portal in March 2019 we have automatically approved 18,130 (95%) applications. In October 2019 we saw the largest uptake of solar applications, passing over 3500 for the month. By the end of 2019 solar connections will have increased by 73% on 2018. Our customers' continued interest in installing DER means that we need to factor this into our plans.

We consider the economic framework set-out in the AER's consultation paper lays out a sensible framework for assessing Distributed Energy Resources Integration Expenditure. We consider that the current Expenditure Forecast Expenditure Guideline supports the assessment of expenditure driven by DER, but note that it is silent on how the AER might do so. The new DER guidelines set in more detail out how the AER will assess expenditure driven by DER within the existing regulatory framework.

We note that several other parts of the framework that are impacted by DER are currently being considered through the Distributed Energy Integration Program (DEIP). Any changes in regulatory arrangements may lead to the need for this guideline to be reviewed to reflect these changes.

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[1] Victorian Renewable Energy Target, 2017-18 progress report, Victoria State Government, The State of Victoria Department of Environment, Land, Water and Planning 2018, https://www.parliament.vic.gov.au/file_uploads/VRET_2017-18_Progress_Report_MMCgCM8L.pdf (accessed 6 September 2019).

Regulatory Proposal and Customer Research

For our forthcoming Electricity Distribution Revenue Proposal we have used a cost-benefit analysis to determine a prudent and efficient augmentation program to enable additional DER. Our approach relies on identifying existing and expected voltage non-compliance at distribution substations. When a particular network segment (i.e. a distribution substation) reaches a constraint we cannot connect further DER without export limiting the new connections, resulting in a lost opportunity to export by potential customers. Our approach to forecasting the amount of efficient augmentation is to estimate the cost of the lost solar generation that would need to be constrained to maintain compliance, and compare that to the cost of augmentation options. Where the cost to augment is less than the value of additional generation, we consider it would be efficient to augment the network to remove the constraint. This means that network augmentation is only undertaken when the additional generation enabled is expected to reduce wholesale energy prices by at least as much as the cost of the works. All customers (including those without solar) will benefit from a reduction in the wholesale energy price.

This assessment approach has resulted in a prudent augmentation program to enable DER customers to export. This includes implementing a Distribution Network Optimisation Platform (DENOP), which enables a dynamic operating envelope (a Smart Network system).

Our customer research revealed high levels of interest in installing DER[2] and a general view that the cost of DER connections be shared across all customers.[3] Based on our customer research, we consider that our EDPR proposal has strong support for an economically efficient expenditure program targeted at enabling additional DER to connect to our network.

Impact of DER varies between DNSPs

When considering the efficient integration of DER we note that the starting circumstances of each distribution business are different. This includes the penetration of DER, presence of smart metering and both the capacity and utilisation of the network. It is important that the AER assesses each DNSP's proposal in the context of their actual network conditions, as is done when assessing load-driven augmentations. As the network impact of DER is highly localised, the percentage of dwellings with a PV system by state/territory do not accurately indicate whether a network will face material constraints. Further, a DNSP may not face material costs until its network starts reaching constraint limits and the costs might increase rapidly from this tipping point.

The AER states that: [4]

> *To date, these approaches [a range of traditional network activities including tap changes and transformer upgrades] have enabled DNSPs to meet consumer DER connections penetration rates of around 30 per cent. Annual DNSP costs to meet the current levels of DER penetration have not been explicitly quantified but appear to have been relatively small.*

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2 This research indicated 60% of non-solar customers were interested in installing DER in the future.

3 The rationale being that DER will be widespread and that non-solar customers will be able to share in the benefits. This represents a cultural shift. When solar was less common, this was not our customers' view.

4 AER, Consultation paper, Assessing DER integration expenditure, November 2019

While it may be true that to date the costs have been small for some DNSPs, the level of network-wide penetration isn't the only metric that determines additional costs, in a similar way that networks experiencing peak demand growth of 1% would not necessarily have similar augmentation requirements.

DNSPs have different network characteristics that will impact their ability to add additional DER. As an example, at the zone substation level, AusNet Services has a network utilisation of 66%, compared to 51% for SAPN, 43% for Energex and 39% for Ergon. This greater utilisation means that, in the absence of augmentation, we face greater constraints on our ability to incorporate additional solar relative to other jurisdictions. As such, we will encounter material constraints at lower average levels of DER penetration than South Australia and Queensland. However, we note this is also a high level metric and so is also only indicative, which is why we consider a more detailed assessment of network impacts is necessary for each DNSP.

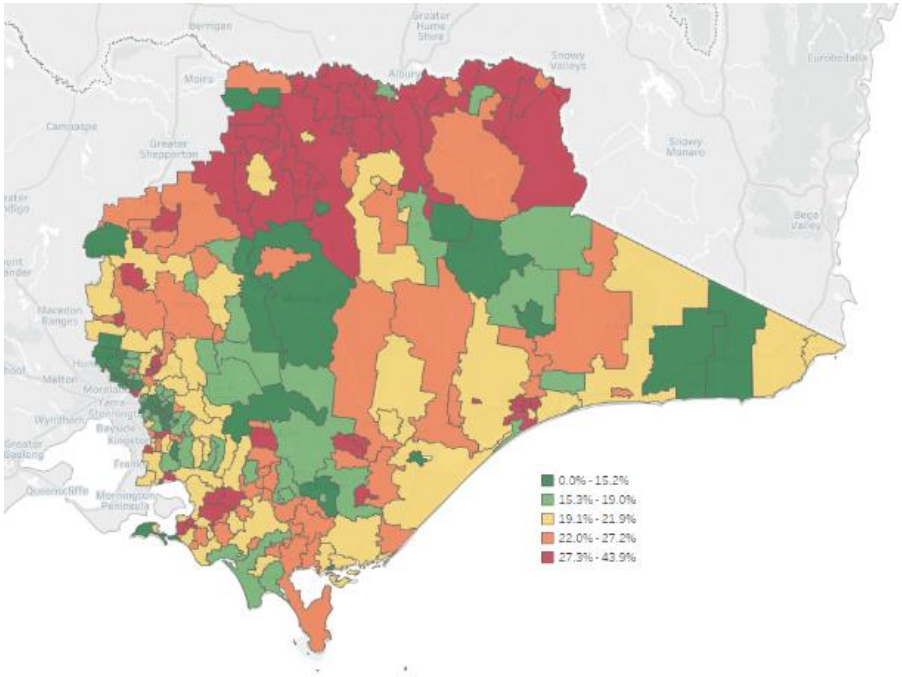
The AER has suggested that, to date:

> *There are pockets of PV penetration where the generation capacity is greater than the installed network capacity, but this is currently very uncommon and is a risk that DNSPs are actively managing, including through deterministic limits on export.*

This does not reflect our experience. In Victoria we have a full roll-out of AMI meters. This provides AusNet Services with much more granular data than is available in other jurisdictions and this has allowed us to develop a detailed understanding of our network and the impacts DER has had. We are already starting to see quite widespread impacts from DER in our network.

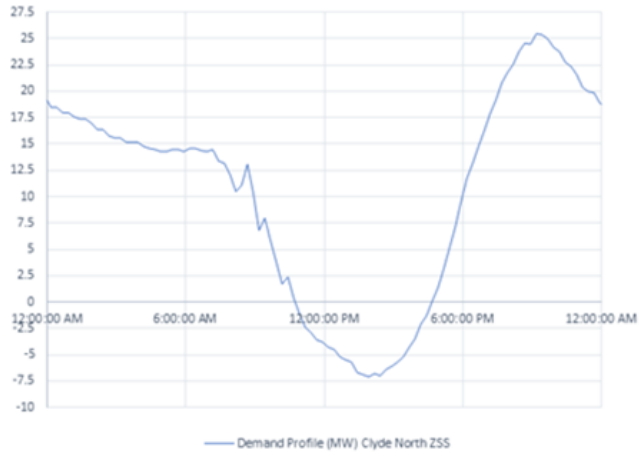
Most DER constraints arise at a localised network level (rather than directly tied to network wide penetration or utilisation). Accordingly, strong localised uptake can be a key driver of necessary expenditure on integrating DER. Figure 1 below shows the variable penetration rates throughout our network. This clearly shows that some parts of our network would be expected to encounter material network constraints earlier than other areas.

Figure 1 Residential solar penetration by postcode



In addition, Figure 2 below shows that AusNet Services is now experiencing reverse flows in some areas of our network, which again demonstrates that material (in the context of that part of the network) DER is emerging in parts of our network.

Figure 2 Minimum Demand Profile Clyde North



The previous low level of expenditure on these issues should not be interpreted as there being no issue with DER integration. It is more accurate that this is a rapidly emerging issue and now is the appropriate time to begin undertaking mitigation actions.

Role of Pricing in Efficient DER Integration

Pricing reform – or making network tariffs more cost reflective – is an important part of the longer term strategy to encourage efficient DER integration and reduce network investment. However, in the short-term the impacts of pricing reform on DER integration is limited by the following factors:

- The customer impacts of pricing reform, as in the short-term there are inevitably 'winners' and 'losers'. This means the pace of change must be tempered to enable customers to adjust, including through making any behavioural changes in response to the price signal.
- Network pricing signals are not always reflected in retail pricing structures faced by end use customers. Where this is the case, customers will not benefit from responding to network pricing signals, and therefore cannot respond.
- Today, much of the DER driving constraints on the network relates to solar PV. This is passive, rather than controlled, DER. While network pricing may provide signals to encourage consumption to occur to coincide with solar generation (ie during the day), many solar customers also work during the day and so their ability to shift consumption during these hours may be limited. In AusNet Services network, for example, solar uptake is relatively high in some commuter suburbs (e.g. Clyde North), where a large proportion of the population with solar PV may be at work during the day. The uptake of batteries to complement solar PV can counteract this, but battery uptake is currently extremely low.

The AER's consultation paper includes an example (Example 1) of the impact of tariff reform on EV customers' charging behaviour. We agree that time of use pricing may be an effective way to shift load – indeed, our upcoming Tariff Structure Statement proposal seeks to apply time of use network charges to customers purchasing an Electric Vehicle (as soon as we are able to identify these customers). However, current EVs are essentially controllable loads. It is much more difficult for current pricing structures to mitigate the short term challenges associated with a higher passive DER uptake, for the reasons outlined above. Therefore, pricing reform has a much more moderated role in managing DER integration in the upcoming regulatory periods than is implied through the AER's Consultation Paper.

Responses to the specific questions raised in the consultation paper are included in the appendix below. If you have any queries about any of the positions outlined in this response, please do not hesitate to contact Michael Larkin on [redacted]

Sincerely,

[redacted]

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

The assessment techniques in the EFA guideline appear sufficient to assess DER integration expenditure and the most relevant expenditure technique is the cost benefit analysis. We have relied upon a cost benefit analysis to underpin our forthcoming submission to the AER for the 2021-26 regulatory period. We consider that similar to load-driven augmentation, this should allow an assessment of the value of curtailed generation and where the cost of curtailed generation will outweigh the cost of augmentation, then it is appropriate to remove the constraints.

We suggest that a key focus of the revised expenditure approach should be clarifying how a cost benefit analysis should be applied to the DER integration expenditure. Of primary importance is clarifying how the value of constrained DER exports and generation should be calculated. In a similar way as the Value of Customer Reliability (VCR) is used in the economic assessment of load-driven augmentations, this value is a key assumption underpinning AusNet Services cost benefit analysis.

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?

AusNet Services prefers that the EFA guideline remains flexible and that unnecessary prescription is likely to be problematic. Data availability and the scale of DER integration issues will differ between DNSPs and the environment may have materially progressed in future reviews, for example, as batteries and smart technologies become more commonplace. As such a principles based approach is more likely to remain relevant over a longer term.

We consider that the key principle is that a DNSP should augment its network to enable additional DER, if the benefits of the additional DER to all customers outweigh the costs. Valuing the benefits of the DER is the area that currently has the least clarity about it. We note that the DEIP collaboration of government agencies, market authorities, industry and consumer associations is looking to develop a standard methodology to estimate value of customer export, which could be used to determine the value of a marginal increase in export hosting capacity.[5] This may be the primary mechanism to provide this additional clarity.

[5] AEMC, Economic Regulatory Framework Review Integrating Distributed Energy Resources For The Grid Of The Future 26 September 2019, pg viii

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?

AusNet Services has detailed data available from its AMI meters, which allows us to demonstrate voltage constraints at the distribution transformer level. This is the gold standard of data which provides a granular view on the impact of DER, enabling any necessary expenditure to be highly targeted. Other approaches may be necessary where less detailed information is available.

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?

We consider that the RIT-D provides a reasonable framework for this analysis.

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?

We agree that robust techniques and data are required to do this work. However, the relevant metrics and assessment techniques have not yet been standardised (to the degree that is practicable). As such, we expect there will be a period of further refinement going forward.

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?

AusNet Services has very good visibility over these parts of our network.

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

Whilst we agree these issues should be integrated into a DNSPs proposal, we consider that these are not silver bullets that can solve all DER integration issues. Further, while DNSPs have some influence in these areas, these factors are not all within the control of the DNSPs.

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?

As noted above, the method of valuing curtailed DER export capability needs to be considered further. AusNet Services considers the Victorian FiT is the appropriate value to use, as it is an independently derived valuation based on a sound methodology. We would prefer a consistent approach to identifying and valuing benefits of DER is developed.

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?

AusNet Services would support a common approach should be developed.

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?

We agree with this in theory, but caution that waiting for future solutions to develop necessarily delays the implementation of existing economically efficient solutions. In the meantime, there may be inefficient constraints placed on customers' ability to connect and export DER. Our analysis shows that a high positive NPVs can be achieved by a modest network augmentation program at this time. Our sensitivity analysis indicates that this holds over a fairly wide range of assumptions indicating that there is a high probability a positive NPV can be achieved. As such, this expenditure is prudent and efficient at this time. Any future more efficient solution would need to be significantly cheaper, with a high degree of certainty to justify delaying implementing a solution that is available now and expected to deliver a significantly positive NPV.

This does not mean that any future technological improvements will be wasted, as DER integration expenditure is not likely to be confined to a single regulatory period. Rather, ongoing technological improvement will be factored into a DNSPs plans over an extended period of time.

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?

We agree that this is appropriate and AusNet Services participates in a national DER API Technical Working Group led by the Australian National University to help develop a common and shared API for DNSPs to communicate with DER platforms. Participation in this working group extends across multiple DNSPs, DER equipment providers and technology providers, and takes a view of the international and local standards environment. However, we note there

would still be integration costs for each DNSP even if everyone implements a common standard.

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?

Again we agree that this is appropriate. Standardisation of communications to DER is a major focus within the industry and within AusNet Services where we have initiated collaborative projects tackling this exact challenge. However, as above, we note that there are still integration costs into each DNSP even if everyone implements a common standard.