

20 January 2020

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By email: AERinquiry@aer.gov.au

Dear AER Inquiry team,

**Re: Consultation paper: Guidance on Distributed Energy Resources (DER) Integration
Expenditure by Distribution Network Service Providers (DNSPs)**

GreenSync welcomes the opportunity to provide input to the AER on the above-named consultation paper. We consider it important for the AER to establish and provide guidance for DNSPs on this increasingly important area to ensure that the best outcomes are realised for all electricity consumers and the Australian community.

GreenSync is an Australian energy-tech company that develops software solutions to connect millions of distributed energy resources (DER) and create more dynamic grids. Our technology, led by deX delivers software tools and services to enable flexible and decentralised electricity grids to establish marketplaces. deX is a digital platform that allows electricity market/system operators and networks to gain visibility and better coordinate the increasing volume of individual DER and aggregated fleets in the electricity grid, while helping consumers get more value from these assets. It provides an open exchange through which retailers and aggregators can recruit DER to VPP offers and enable service contracts to be published by system, and network operators.

Today we have a number of pipeline and active projects locally and globally with distribution networks and industry partners using deX products (deX Connect, deX Vision, deX Command, and/or deX Markets). In these projects, integrations with DER, capacity to 'see' DER information and the ability to control (request) DER services are being delivered. In some cases, the projects have come about through government innovation funding opportunities. Others were driven via a case to reduce or avoid a 'traditional network' solution.

The above direct experience underpins our response to this consultation paper.

GENERAL COMMENTS

While there is always a lag effect on regulation in comparison to technological developments, we consider that concerted efforts from the regulatory side are needed, now. It is vital that regulation is updated as we transition to better facilitate a future operating state that meets growing needs in

the regulatory framework and architecture for DER roles in our energy system in the next 1-3 years (near term) and over the next 5-10 years (medium term).

Based on our work in Australia and internationally, we consider there is a global move towards a Distribution System Operator ("DSO") model. Under this model, the distribution businesses interact with third party assets and energy service companies *in addition to* the management and operation of traditional network assets which they do under the current "DNO/DNSP" model.

To achieve outcomes that align with the National Electricity Objective (NEO), we consider there are three things that need to be pursued in relation to the use and treatment of DER within the network.

1. Connection of customer owned DER is facilitated to maximise the utilisation of existing network assets, with clearly defined rules describing network access arrangements;
2. Network investment driven by DER in the network is undertaken only where it is economically efficient to do so, irrespective of who pays for it;
3. As much as possible, and where cost effective, the use of data and physical services provided by DER is considered as an alternative to traditional approaches for all network issues (DER related or not).

While DNSPs are ultimately the primary decision makers with respect to these issues, regulation plays a significant part in providing direction and frameworks. We acknowledge that it is not practical or sensible for regulation to pre-empt technologies by picking winners. However, action can be taken now to ensure that the most sensible, least regrets path is pursued. This will ensure the transition a future operating state in the near (next 1-3 years) and medium term (next 5-10 years) delivers the best outcomes for all.

Consequently, we commend the AER for progressing this consultation process. Guidance for the assessment of DER integration expenditure is a key and critical element here. We also believe there is merit in the AER adding to this present work program by

- Establishing approaches to optimise the integration DER (to reduce network costs)
- Supporting and/or developing guidance on available options/approaches to reduce restrictions on the connection and behaviour of DER in the network.

In our view and that of key Australian institutions and industry bodies (the AEMC¹, the Energy Security Board² and the Clean Energy Council³), the increasing penetration of DER provides a growing opportunity for service provision from DER that will provide a cost-effective alternative to traditional network expenditure. GreenSync is working globally, today, with a number of networks, on flexibility service contracting arrangements that are consistent with this direction.

Where possible we have referred to relevant experience in responses to the questions below.

¹ AEMC, 2019. Information paper - How digitalisation is changing the NEM – the potential to move to a two-sided market

² Energy Security Board, 2019. Post 2025 Market Design - Issues paper – September 2019.

³ Clean Energy Council, 2019. The distributed energy resources revolution – a roadmap for Australia's enormous rooftop solar and battery potential.

GREENSYNC RESPONSES TO CONSULTATION QUESTIONS

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?

As the penetration of DER increases, if allowed to connect and import/export unconditionally with no externalities, the cost to maintain the quality and reliability of standard control services will increase.

In an ideal world, the DNSPs would be able to accurately quantify the impact of DER on achieving least-cost to maintain the above service outcomes. However, DNSPs do not necessarily have sufficient visibility of the LV networks to optimise the timing and selection of solutions. Today, action is often taken reactively as issues are identified. As visibility of DER is improved a significant volume of issues in the network (not previously known) may become evident.

GreenSync considers that the AER should keep in mind that increased volume in identifiable/identified network is not necessarily that the DER is responsible for that network issue, but its capability may drive up reporting and identification volumes.

With regard to attribution of a particular network need to DER, there are a number of activities that may be undertaken by the network to mitigate the impacts of DER. These relate to a variety of network issues. DER may have been a contributing factor, however it is often challenging to attribute a particular network need solely to DER. While today, DNSPs report activity undertaken (at a high level) without any detail on the issue that has driven the need for them. To better understand the impact of DER on the prevalence and occurrence of network issues, there is likely to be merit in increased granularity on the volume of particular network issues.

While we appreciate increased granularity in reporting would need to be balanced against the additional cost of collecting this information.

In our view, there are potential pathways to ensure such costs are streamlined and minimised across all DNSPs by considering the network and DER sides together. From our perspective, on the DER side there is significant potential for streamlining API based approaches, identifying consistent DER data sets and supporting third party provision pathways. As noted above, there is a balance to be achieved

Importantly, AER guidance can play a key role in supporting networks to iteratively move to capturing additional information (see also the response to Q3), that can be implemented fairly and managed in terms of scope, scale and pace. One area to focus on here is DER registration and associated dynamic connection agreements. For more on this topic, please see **Appendix A: DCAs discussion paper**.

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?

For network issues, the Regulatory Investment Test – Distribution (RIT-D) framework is a good starting point for ensuring that a suitable range of options are considered. However, the key

limitations with the RIT-D framework is that its scale is allied to large assets and projects and is set quite high. The relative scale also drives multi-year procurement timeframes and can feature less than optimal decision-making efficiency.

In our understanding, the majority of issues introduced by DER occur in the LV network where the cost of solutions to particular problems fall far below the RIT-D cost threshold. However, as each DNSP hosts many thousands of LV networks, there is likely to be a number of issues in other LV networks of a similar nature that may be resolved with similar solutions.

We propose that the AER develop a multi-region, or cross-jurisdiction program of work for resolution of particular network issues that can be drawn on over a specified time period. As per the RIT-D, where program of work exceeds a certain cost threshold, alternative options should be considered.

In our view, alternative (non-network) solutions should be required especially at this level. A combination of dynamic approaches and the use of service provision may present as cost effective an approach compared to traditional network approaches. Such provision may include things like:

- Customer DER connected with a dynamic connection agreement to specifically allow for visibility and control capability. Control of the DER could be specified to apply at times of very low or very high demand, in exchange for higher export or bigger systems being installed by the customer, to avoid or reduce the need to expand the network to accommodate more DER (up to a certain threshold). (See **Appendix A**)
- Procurement of demand response services from aggregators – via a market or contracting arrangement – in a local LV network area could avoid the need for additional investment or expansion of a distribution transformer.
- Procurement of data from customer DER – from third party providers – to improve the visibility for forecasting and planning, reducing the need for network monitoring equipment expense.

Critically, to allow the lowest cost solution to be identified, this information should be published in an accessible and time efficient manner to allow third parties to offer solutions. This sort of publication of opportunity will enable increased transparency over the options the network is considering.

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 effective 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 it is 'reasonable to assume' that such techniques will play a part in developing dynamic models of the DNSPs network.

Given DNSP's current level of visibility (limited) they use sampling and modelling techniques to feed into forecasting and analysis. The use of these techniques provides indicative values.

Without alternative options with regard to potential DER integration and service potential, networks must either be overly conservative in allowing new DER to connect to the network or accept the risks

associated with the network moving outside its technical limits. As at today, most networks err on the side of caution and are conservative with regard to connecting the DER to the network.⁴

As the penetration and diversity of DER continue to increase, (eg. solar PV, energy storage, smart pool pumps, demand-response enabled devices and home/site/facility management systems) the impacts of these on each local network become harder and harder to predict using traditional sampling and modelling techniques. To provide the maximum utilisation of the network, while remaining within technical limits, more sophisticated and innovative approaches to sampling and modelling are likely required.

In our view, sampling of DER data could be provided by third parties which would then support networks to more accurately develop dynamic models. For more, see the response to Q4 below.

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?

DER technology vendors and/or data providers (who may be the same entity) are able to provide networks, both static and dynamic information about DER. We understand that some technology vendors already sell DER data to DNSPs and that there is both appetite and scope for improved consistency and scale to simplify the process for both technology vendors and DNSPs.

Consistent with the above question about sampling, there is a balance to be found regarding increased information to support decision making and 'increased information' to the network.

To ensure that data for visibility is procured in the most cost-effective manner, all of the available options must be considered and compared. Ideally, third parties that collect data should be given the opportunity to offer data as a service solution to networks on competitive, commercial terms. Such a market-based approach may support DNSPs and the AER to balance increased information to support decision making and 'increased information' to the network.

Where a network is interested in a particular set of data that is not currently collected by third parties, by publishing data requirements, data service providers can understand what the requirements and offer to meet that need.

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?

This question can largely be split into issues of tariffs and standards.

⁴ CitiPower-Powercor United Energy, 2019. Enabling rooftop solar exports options paper for consultation – regulatory proposal 2021-2025

Tariffs

Tariffs determine how the cost of supplying distribution services to customers is apportioned across the customer base. We consider that the degree to which tariffs reflect the actual cost to supply should be considered in the assessment of DNSP's regulatory submissions.

While policymakers and regulators have debated and pushed for a transition to cost reflective tariffs, time-of-use tariff settings because they make economic sense, the pace of transition has been slow, at best. Rather than revisiting tariff reform arguments, we posit that DER can provide opportunities for networks to evolve and innovate around tariffs.

In one of our projects, our distribution business client is developing a technology-based tariff for EV charging to encourage optimisation choice by customers that can (also) benefit the network. When combined with a dynamic connection agreement, the network gains visibility and capacity to control the DER at times of network stress. This supports the customer and the network.

As noted above, if networks were incentivised to consider and – where efficient – contract DER services as an alternative to 'traditional network approaches', the 'tariff only' approach to revenue from customers, and the focus on tariff structures, could shift to a far more holistic discussion regarding wider economic efficiency and system benefit. As such, the arguments about cross-subsidies from non-DER owners to DER owners (and wider economy cross-subsidy issues) can be addressed by enabling the DER benefits accruing to the network and the owner to benefit the local and wider community.

Standards

Technical standards provide tools for DNSPs to ensure that the connection of DER to the network does not adversely affect the ability of the DNSP to deliver safe and reliable electricity to all network users.

Technical standards provide a degree of protection from autonomous DER. However, reliance on a "standard" that exists, or a new "standard" being developed is not a panacea for the challenges presented by DER today and in the near term. The big challenge for Australia is that we are further advanced in DER (particularly solar) penetration than many other countries. As such, standards for DER telemetry (data provision) and dispatchability (contracting and control) do not yet exist, anywhere. Practical implementations in the form of emerging projects, demonstrations and trials exist but are not at a scale where we can adopt a known model which is the usual underpinning of the development of standards.

Given this reality, GreenSync has been working on pragmatic approaches that acknowledges our present needs and the expectation that standardisation will, of course, emerge over time. At a basic level, there are some practical actions or capabilities that could become part of 'standards for DER' over time. These will likely include:

- Telemetry capability for DER
- Connection to a technology vendor cloud
- Dynamic connection agreements/dynamic management approaches being encouraged, and increasingly supported for scales/classes of customers

- DER control conditions, including curtailment, being clarified: (eg, under what network conditions can this be done? What customer or asset protections are expected? How do we achieve equality or equity outcomes?)
- DER flexibility service contracting to a DER owner being enabled through agency to an aggregation provider (retailer or energy services company).

For a more in-depth discussion on standards for DER and navigating from where we are today through the transition and out to flexibility services contracting and markets, please see **Appendix B: Navigating standards and frameworks for DER.**

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 with other components of a revenue proposal the level of analysis should be commensurate to the magnitude of the investment. For network investments that provide some customer (or other party) benefit, the methodology used in the calculation of the benefit should be clearly defined. Ideally this would include all input data sources such as expected DER growth rates (by DER class or type), as well as the methodologies for intermediate calculations (quantification of value).

In relation to assessing options from the customer's perspective, it is important – in our view – that the AER have regard to ensuring that customer's future options and access to markets is enabled early on. Even if those markets are not yet in place, we see a key role for the regulator to play a role in facilitating the evolution and access to markets for DER and wider system optimisation that will catalyse.

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?

As highlighted above, to best deliver outcomes in alignment with the National Electricity Obligation (NEO), DER services should be considered as an alternative to traditional network approaches. Whether the services being provided are data services or physical services the outcome is the same; they provide an alternative for traditional approaches to network investment and management.

A key challenge here, though, is information. What is the mechanism for service providers to understand where network opportunities exist? While information in distribution business' annual planning reviews (DAPRs), the RIT-D and the AREMI network opportunity maps provide some of this information, to give prospective service providers the best opportunity to offer their services as an alternative, service requirements should be published by networks themselves in a clear, timely, consistent, and easy to understand manner.

While each network might have slightly different requirements, the methodology behind the pricing and procurement of services from DER should be transparent to facilitate fair and efficient decision making.

In order to procure such services in the first place, however, there are a range of network access arrangements to specifically consider. While not directly related to this consultation, GreenSync appreciates that related work programs are considering this specifically. As such, we note that the following steps (related to access) would support increased effectiveness of any DER integration expenditure guidelines:

- DNSPs being required to facilitate the connection of DER where there is latent network capacity and no additional investment is required.
- Allowing the above and combining this with dynamic network management which will allow for greater utilisation of existing network assets as well as customer freedom and flexibility.
- An incentive arrangement to support dynamic network management and connection of DER. This might be through a revision of NER rule 6.1.4, or the development of a suitable incentive scheme relating to network utilisation.
- Quantification of the value of customer network access which can be used in the comparison of options to determine that with the highest net benefit.

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?

Theoretically at least we would expect this to provide a valuable process. We support the notion that such an assessment an 'options value' should test if there is a more efficient near-term option and/or whether there are multiple benefits and pathways.

Given the rate of change of technology, the expected required volume of investment and the payback period of network assets, significant effort should be placed on finding solutions that avoid CAPEX. Irrespective of the specifics, viable alternatives that should be considered include the implementation of system solutions that allow the DNSP to interact with DER. DNSPs should be incentivised to find these alternatives, not just through demand management incentives but overall in their pricing proposals. As noted above, this is consistent with global moves towards 'DSO' operating models for network companies.

Such solutions will likely include augmentation of existing network management systems, and the implementation and integration of new systems. While each DNSP has their own specific context in their network management technology stack, they largely operate the same core systems. This is because the requirements for each network are fundamentally the same.

If each of the 15 DNSPs across Australia were to undertake their own implementations and perform the same rework, the costs are multiplied. From this perspective, it is important that the AER work with DNSPs and technology vendors to more deeply understand the options available and emerging to support efficient DER integration investment.

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?

The development of common platforms, communication standards and shared systems will certainly reduce the overall cost of integrating DER in the longer term. To minimise the risk of duplication and rework, a coordinated approach can leverage shared learning and common systems where appropriate.

GreenSync's deX product and software suite is directly suited to this ambition to drive towards common platform, communication approaches and shared system approaches that can deliver:

- Iterative and increased coordination capabilities
- Lower costs to DNSPs
- Lower barriers to entry for technology vendors
- Lower costs to consumers
- Increased access to value and value streams by DER owners as volume increases
- Increased optimisation at local, regional and national levels.

We support the inclusion of requirements to demonstrate that prior works and trials have been considered in any proposed DER integration solution.

In relation to standards, while we acknowledge the importance of working towards common standards, the development of standards before trialling and iterating on solutions presents a number of risks. Please also see our response to Question 5.

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?

To ensure that the best customer outcomes are achieved across the NEM, it will become increasingly important for DNSPs to collaborate and coordinate with each other in the development of a common approach in development of DER integration solutions.

While each DNSP will certainly have their own needs, a high-level common approach across DNSPs for DER integration intuitively makes sense from a system efficiency perspective. We believe such an approach could be found and agreed upon. This approach should ideally be guided by a set of common requirements that can be leveraged by all DNSPs.

Where a DNSP is proposing an approach that deviates from the high-level common approach defined by DNSPs, the AER should require justification and evidence to demonstrate deviation is necessary and is in the best interest of customers.

Our deX platform is designed directly to address the challenges faced by Australian and global network businesses in coordinating DER, enabling access to value streams and driving down overall costs to consumers from the energy system.

For queries in relation to these comments, please contact Bridget Ryan on [REDACTED] or [REDACTED]

Your sincerely,

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