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6 September 2021

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By email: AERinquiry@aer.gov.au

Assessing Distributed Energy Resources Integration Expenditure

Dear Kris,

We appreciate the opportunity to comment on the Australian Energy Regulator's (AER) DRAFT DER integration expenditure guidance.

Energy Consumers Australia is the national voice for residential and small business energy consumers. Established by the then Council of Australian Governments Energy Council in 2015, our objective is to promote the long-term interests of energy consumers with respect to price, quality, reliability, safety and security of supply. Like the AER we see the cost-effective integration of DER as essential for the development of a future energy system that meets consumers' values, needs and expectations. Given our interest, we applaud the AER for developing guidance that requires electricity distribution networks to transparently articulate their business cases with clear input assumptions for integrating DER.

While we have not had an opportunity to clearly examine all the issues – and answer all the questions raised in the Guidance Note – we have two primary concerns with the guidance as drafted. First, given the historic lack of distributed network service providers (DNSP) engagement with non-network alternatives, the guidance should more clearly require networks to closely examine the use of non-wires and demand-side alternatives for integrating DER. Secondly, the guidance raises a larger point – broader than this proceeding – about the appropriateness of existing regulatory frameworks, such as the RIT-D given consumer engagement with the energy system. By the AER's own admission, the RIT-D does not assess the holistic benefits of DER to consumers and the system. As a result, a future-ready and consumer-focused framework for investment assessment is required, and we invite the AER, and other relevant market bodies and industry stakeholders to collaborate with ECA to examine the potential of evolving the regulatory framework evolution to account for consumers' values, needs and expectations and the changing energy system more effectively.

These two overarching issues are summarised below. Together with a range of related matters, they are examined in more detail in the attached paper jointly developed with Strategen Consulting.

The AER should require DNSPs to use non-wires and demand-side alternatives to integrate DER unless DNSPs produce analysis demonstrating that other alternatives (e.g., network augmentation) are more cost-effective and better align with consumer expectations.

Notwithstanding the below concerns regarding the RIT-D and broader regulatory framework, we recognise the need – and value – of the AER providing additional guidance to networks on how to frame expenditure requests for integrating DER. We appreciate the AER's interest in promoting alternative options by stating that "for DER integration investments that include augmentation expenditure, DNSPs should demonstrate the consideration of opex or ICT capex options, such as dynamic voltage management systems to improve low-voltage network visibility and better utilise existing network hosting capacity."

Our primary concern with the guidance on the options analysis as drafted is that it is unclear that it will lead to the least-cost option for integrating DER over time. It is clear from an absence of network-led projects that there are still barriers preventing DNSPs from choosing non-network solutions. It is also clear that the main issue with integrating DER today is a surfeit of low-cost solar generation on distribution networks in the middle of the day. The likely lowest cost option for solving this issue is to harness the inherent flexibility in consumers devices – water heaters, air/con, pool pumps, batteries, electric vehicle charging, etc – to have them consume energy when there is too much of it.

As has been well illustrated in various studies, there are many non-economic barriers to the adoption of non-network solutions by networks. The most addressable are a lack of experience with developing business cases and implementing non-network solutions. This guidance provides a clear opportunity to help overcome these barriers by requiring DNSPs to develop business case options addressing the potential for non-network and demand management solutions, even if that option is not ultimately chosen because further analysis demonstrates that other approaches are more cost-effective and better align with consumer expectations. This requirement, along with the transparency inherent in such processes, will build capability within networks for better understanding and articulating the benefits – and barriers – to developing these solutions in the future.

As a result, we recommend that the guidance note includes a rebuttable presumption requiring DNSPs to use demand management and non-network alternatives to integrate DER. In other words, AER should mandate that DNSPs adopt demand-side management and non-network options for DER integration unless the DNSP can demonstrate that other approaches (such as network augmentation) are more cost-effective and better align with consumer expectations.

A future-ready and customer-focused framework for investment assessment is required.

As the AER knows, consumers continue to adopt DER at a record pace and there is little reason to believe that the rate of adoption will meaningfully slow in the near to medium term. Indeed, ECA's own survey data and all credible analysis we have seen indicates continuing strong adoption of DER. While financial considerations are a strong influence on consumer preferences and decision to adopt rooftop solar, batteries, electric vehicles, and flexible appliances, they are by no means the only reason they are poised to continue adopting these technologies. Energy independence, support for community, interest in new technology, and environmental advantages are just some of the "intangible benefits" consumers receive from adopting DER. Critically, it is intangible benefits that have considerable explanatory power in consumers behaviour, either to self-consume or to export, or are the challenges in unlocking flexibility in energy use.

The guidance acknowledges "that some customers may value these intangible (or non-monetary) benefits". Nevertheless, "in line with the RIT-D principles" the guidance instructs DNSPs to "not include any intangible benefits". The FAQ document released alongside the CSIRO and CutlerMerz Value of DER Methodology Study states that, "The main reason for excluding [intangible benefits] is

that they are indeed difficult to quantify, and the simplest and cleanest approach is not to include them in the methodology."

The prevalence of an existing regulatory framework – such as the RIT-D – and the difficulty in quantifying consumer motivations for making choices that are fundamentally reshaping the energy system are not sufficient rationale for excluding significant benefits to consumers in the cost-benefit analysis used to assess network business cases. To the extent that it demands the exclusion of intangible benefits and requires a least-cost approach to network development independent of consumer preferences, the RIT-D is not future-fit, without some further consideration of customer perspectives and in making allowances for future uncertainty and potential future value.

The draft guidance notes that the RIT-D aims to "maximise the present value of the net economic benefit to all those who produce, consume and transport electricity in the NEM". While this approach was sensible in a 20th-century, uni-directional power system, it could lead to unintended consequences if the AER continues to apply such an NPV approach in today's system without due consideration of the value inherent in the increasing levels of consumer generation. The conventional approach to maximise the present value of the system effectively pits distributed generation against large-scale generation, aiming to optimise for the lowest-cost option independent of consumer preferences for a more decentralised approach to support their own investments.

There are several issues with the conventional approach, however. First, from a practical perspective, it may not be obvious or clear to a consumer what the lowest cost option is for them. Long term trend analysis in South Australia indicates that additional solar energy is likely not needed in the state, but there are few if any market signals to consumers in South Australia suggesting that this is the case. Even if there are, there are no indications that consumers in SA are significantly slowing rooftop solar adoption.

Further, even if it becomes overwhelming clear to policymakers that additional rooftop solar no longer "maximises the present value" of the system for all participants, no one – including distribution and transmission networks and the AER – believes that restricting consumers' ability to connect their DER to the network is a sustainable long-term approach. Indeed, the recent Access and Pricing determination creates an obligation on networks to provide export services independent of their "net economic benefit". A clearer linkage of this DER guidance with tariff reform and the new Access and Pricing rule change can help ensure equitable and fair outcomes through additional DER investments.

In other words, the system will need to continue to integrate consumers' DER even if consumer DER investments and the investments that integrate that DER fail to "maximise the present value" for the entire system. The proposed analysis framework, however, intentionally excludes values that are motivating consumers to invest in DER. The result of such a framework could foreseeably lead to an overinvestment in network or centralised infrastructure because it will continue to imply value in building networks to connect large-scale power plants, even if consumers are choosing DER for non-financial reasons.

Despite the need for a need for a future-ready and consumer-focused framework for investment assessment, we recognise, that this proceeding is likely not the appropriate venue for prosecuting the RIT-D's defects or developing a future-fit regulatory framework that appropriately accounts for consumers and the role they are playing in the energy system. Accordingly, we invite the AER, the AEMC, and other relevant market bodies and industry stakeholders to collaborate with ECA to examine the potential of evolving the regulatory framework evolution to account for consumers' values, needs and expectations and the changing energy system more effectively. Both ARENA's Distributed Energy Integration Program and the RACE for 2030 Cooperative Research Centre are

potential R&D and funding partners for progressing an initiative to ensure that today's regulatory tools and framework match the market and are fit for purpose.

As noted above, these two overarching issues – and several others – are examined in more detail in the attached paper jointly developed with Strategen, which has been informed by discussions with some but not all key stakeholders. Thank you again for your time and consideration of our comments.

Yours sincerely,

Brian Spak

Director, Energy System Transition

Encl: A Future and Customer Focused Approach to DER Integration Guidance Prepared by Strategen Consulting

A Future-resilient & Customer-focused Approach to DER Integration

Prepared For: Energy Consumers Australia

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September 6, 2021

A Future and Customer Focused Approach to DER Integration Guidance

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Introduction

Australia's electricity systems are experiencing perhaps the most profound period of transformational change since the dawn of electrification in the late 1800's. In this wider context, Distributed Energy Resources (DERs), continue to grow with enormous potential to deliver enhanced customer value and significant electricity system efficiencies.

The topic that the **Australian Energy Regulator's (AER's) Draft DER Integration Expenditure Guidance Note (the 'Guidance Note')** addresses is therefore particularly important and relevant in this current context where power systems across OECD economies are experiencing this once-in-a-century scale of transformation.

In Australia, this is a context where we are rapidly moving toward 100% of instantaneous supply being served by Variable Renewable Energy (VRE) generation in an expanding proportion of operational time windows each year. As Daniel Westerman, CEO of the Australian Energy Market Operator (AEMO), said recently[1]:

> *"So, the goal that I'm setting… (is) to engineer grids that are capable of running at 100% instantaneous penetration of renewable energy. And do this by 2025!*
>
> *"That's not decades away. It's just a few years' time.*
>
> *"This is unchartered territory for a large, independent grid anywhere in the world."*

Directly relevant to the Guidance Note, a sizable (and growing) proportion of this VRE capacity will be provided by distributed generation sources, including customer-sited DER, connected to the various distribution networks serving the NEM.

In this increasingly dynamic future, bulk energy, transmission and distribution systems – together with deep demand-side flexibility – will increasingly need to function in whole-of-system manner to support power system operations that are reliable and cost-efficient.

As such, the AER's Guidance Note is very timely for helping ensure the sector's efforts to integrate DER are considered in a manner that actively addresses the needs and aspirations of diverse energy customers in a manner that enhances transparency and equity.

Energy Consumers Australia (ECA) has commissioned Strategen to provide a future-resilient and customer-focused perspective on the AER's Draft DER integration expenditure Guidance Note ('Guidance Note') Consultation. Energy Consumers Australia and Strategen support the development of clear DER integration strategies and approaches that transparently demonstrate what benefits DER integration efforts and investments are delivering for customers.

[1] https://aemo.com.au/en/newsroom/news-updates/the-view-from-the-control-room

An increasingly dynamic context requires more adaptive regulatory mechanisms

Transformational and disruptive market forces in any sector are ultimately driven by empowered customers. Technology and business model innovations play a key supporting and enabling role, but it is the needs and aspirations of current *and* future customers – how they define progress for themselves – that ultimately drives disruptive change.

What has been called 'The Age of the Customer' has, for good reason, also been called 'The Age of Disruption'. And Australia's power sector, like every other sector, is not exempt. As Westerman also observed concerning Australia's uptake of DER, particularly in terms of DER investment, governance and system implications:

> *"It is a stunning democratisation of power.*
>
> *"It's a transformation: turning historically passive electricity consumers into active generators.*
>
> *"And a capital transfer, too. Power infrastructure investment decisions that were once the preserve of our nation's boardrooms are now being made around the kitchen tables in our towns and suburbs."*[2]

The sheer scale of Australia's power system transformation, and the pivotal role that customer investment in DER is playing – and will increasingly play – cannot be overstated. It is indeed a once-in-a-century scale of transformation. Further, this 'democratisation' of investment decision making, 'aided and abetted' by the rapid evolution of DER technologies and business models, means that relevant regulatory investment instruments must also actively evolve. In this operating environment, robust and durable regulatory models will require – by design – an increasing capacity to accommodate levels of ambiguity and uncertainty that were simply unimaginable in past decades.

It is therefore critical that the DER Guidance Note is developed with a view to progressively expanding the adaptability and flexibility of the relevant regulatory investment assessment mechanisms, commensurate with the nature of the current and uncertain future operating environment. This will help ensure a more future-resilient regulatory approach that is capable of maximising long-term benefits for all consumers in a context where investment decision making is diffused more widely and exercised across an expanding range of energy technologies.

[2] https://aemo.com.au/en/newsroom/news-updates/the-view-from-the-control-room

Customers must be truly central in shaping the future of our power systems

In recent years, the electricity sector has been learning the language of customer-centricity. However, at a functional level, we can easily perceive customers and DER technologies as system 'resources' or, worse, as problems that need to be managed or constrained. While perhaps this may be mostly subconscious, where true it is a long way from the reality that customers are the fundamental reason that the power system exists.

Importantly, the design of formal and regulatory structures can play a key role in progressively reshaping long-established but now dated patterns of thought and action. In this case, a new paradigm is required which focuses on how networks may more effectively comprehend and serve the needs and aspirations of both current and future customers. This is especially relevant as customer investment decisions are now playing an increasing role in shaping the future of the system in ways that may plausibly exceed current forecasts. As such, an evolved paradigm would place a high premium on better anticipating the plausible range and diversity of customer DER investments over relevant time horizons. It would also require the detailed consideration of demand management and other non-network alternatives as credible options for better integrating DER in a manner that provides both customer and system benefits.

In previous submissions to the AER on Ring-Fencing we highlighted the uncertainty that our sector faces as technology disruption and customer choice to invest in generation, storage and energy management continues to drive significant transformation. Due to this uncertain and ongoing disruption, we cannot currently confidently anticipate how such opportunities will be realised and evolved through emerging distributed technologies and platforms. Any guidance from the AER on investments to support customer choice and DER investments therefore needs to be suitably flexible to suit this uncertainty and potential for as-yet unanticipated customer value.

On this basis, we are concerned that leveraging the RIT-D framework and process, which has not been widely successful in procuring demand-side alternatives to network investment, may not allow a flexible consideration of how current initiatives might lay a foundation for future programs, investments, initiatives or approaches to DER integration, especially when many of these may not yet be well recognised or mature. With the growth of demand side flexibility, will the RIT-D framework appropriately encourage networks and other industry participants to pursue emerging opportunities to procure network services and flexibility from this growing customer side resource? While we support the AER's proposed principles-based approach as allowing appropriate flexibility for networks to explore a range of potential DER integration approaches, we question whether this framework will maximise the value that customers can receive by leveraging their own resources and discretionary flexibility to minimise system expenditure? We therefore suggest that the DER integration guidance should require networks to demonstrate how they have considered demand-side solutions and programs in any DER integration cases. We

suggest this additional guidance so that the AER can ensure that DER integration efforts appropriately explore these emerging capabilities for non-network solutions and incentives that leverage consumer investments behind the meter. This is likely to ensure appropriate focus on growing capability to reduce system investment over time.

Customer perspectives are required to validate and justify system investments made on their behalf

For the above reasons, it is unfortunate that the Guidance Note does not currently give any substantive consideration to customer engagement regarding system investments to support DER integration. We appreciate that aspects of this may occur as a matter of process as networks consider customer perspectives in their Regulatory Submissions.

However, given the nature of this topic, we suggest the central core of this exercise should be proactively framed around customer perspectives. As such, this approach would give particular consideration to how DER integration investments will support fairness and equity in how the benefits and costs are shared and allocated across all customers. This would also include a substantive consideration of how those who cannot invest, for example in solar PV, may be able to financially benefit through network DER Integration investments and through programs such as the coordinated management of flexible (discretionary) customer loads such as hot water and air conditioning for peak demand and 'solar sponge' system services.

It is critical that any DER investments are justified with customer engagement and an understanding of customer preferences for investment to inform and support any DER integration investments by networks. Customer side investments and growing demand side flexibility offer a growing range of value and potential services to the system, including non-network services. These customer investments and desires should have a strong bearing on how networks should seek to unlock increased DER value and assess how they can support and engage with customer demand side flexibility as part of network investment to support growth in DER. It is our recommended expectation that growing demand side resources will feature increasingly in network programs and procurements. We consider that this is an important step to support the development of this important capability to realise the benefits of growing demand-side customer capability and flexibility.

Demand-side flexibility will be essential to reliable and efficient system operation

As noted earlier, increasingly dynamic power systems with expanding levels of VRE generation, will benefit from increasing levels of demand-side flexibility to balance supply and demand efficiently and dynamically. This is especially so where a significant proportion of this variable capacity is provided from distributed DER.

Demand-side flexibility allows customers to modify their operational behaviour of discretionary loads in response to the needs of the bulk power and/or local distribution system and usually in exchange for a financial incentive. This demand-side flexibility can be efficiently provided by a wide range of priority technology classes located at customer residential, commercial and industrial sites. Given the scale of Australia's power system transformation, it certainly should not be limited to comparatively recent technology classes that are more likely to be owned by more financially secure customers.

Therefore, the definition of DER applied in the Guidance Note is unduly limited in its focus only on rooftop solar PV, batteries, electric vehicles and energy management systems. We agree with the AER's Consumer Challenge Panel (CCP), who presented at the AER DER Integration Stakeholder Forum[3], that "*DER needs to be considered in the greater space of active demand response, which incorporates a range of demand side flexible capable technologies, such as hot water systems and pool pumps".*

It is important to note that the same incentives and price signals that will be targeted at DER operation will also directly impact the approaches that customers might use to adjust their usage across a range of household technologies beyond those defined narrowly in the draft Guidance Note. Therefore, we agree with the CCP that regulations and innovations should *"encourage the whole demand response picture".* For instance, we expect that customers may choose to leverage their own collective energy resources to minimise their export (e.g. by redirecting energy into a pool pump or hot water system) at times of minimum-system demand rather than having their solar PV constrained or tripped off. Customers who invest in DER and flexible energy resources at their premise (or perhaps through off-site community programs) are likely to approach their decisions more holistically than a siloed regulatory paradigm that differentiates between DERs (generation) and other appliances (flexible loads). Approaches to DER integration should therefore be treated more holistically, rather than focusing on only a part of the household energy mix.

Viewed in this light, emerging applications such as community storage may also have greater value to offer. However, as such solutions blur regulated and unregulated barriers, it is unclear how such value will be most appropriately apportioned.

Ultimately, as a general and wide-ranging observation, we believe the application of a traditional NPV-based approach is unlikely to adequately evaluate the full range of more flexible, varied and constantly evolving range of demand-side and non-network options that are capable of enhancing DER integration[4].

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[3] Consumer Challenge Panel presentation - AER Online Forum on DER Integration Expenditure Guidance Note – 5th August, 2021

[4] While beyond the focus on this submission, it should also be noted that the physics-based characteristics of Australia's expanding fleet of centralised and distributed VRE will require all parts of the power system, including demand-side

There is significant potential for inequitable outcomes and unforeseen customer impacts

We are also concerned about the very real risk of inequitable outcomes as DER investment grows (on both sides of the meter) without more deliberate customer engagement in relation to DERs and connection to broader tariff reforms. We understand that the AEMC's Access and Pricing consultation has been deliberately separated from this DER integration consultation, however, it is difficult to envisage how engagement on DER expenditure can be progressed without a parallel and related consultation on how these investment costs will be allocated. Some form of subsequent transparent and detailed engagement is required with customers to connect and progress both of these reforms and any DER related network investments.

While we understand that this is the intent in considering the impacts of tariff reform on DER integration requirements, we believe that linking this intent more explicitly to customer engagement would help clarify this important issue. It is our view that no prudent and justified investment case can be made without clarifying how the costs and benefits flowing from such investments will be allocated and shared amongst customers. Furthermore, this should also be captured in how localised benefits of DER investments can be shared with all local customers. For instance, the recent evolving application of local community storage provides an example of how network investments might unlock more localised DER for a wider range of local customers. We acknowledge the Guidance Note's requirement to understand the impacts of tariff reform on DER behaviour, and on required network integration investment, but this requires careful attention due to the implications of tariff reform for the fairness of how system investments are shared.

For customers to derive the range of benefits aligned with their household or business needs, close engagement in the development of effective (and fair) price signals will be required. As outlined in the methodologies as adopted in the AER Guideline, such price signals should reflect the value that customers place on such investments. Not only does this speak to the need to ensure such value is provided in a fair and equitable manner, but also to the importance of giving consideration to how investment decisions and business cases will impact customer amenity, demand-side investments and decision making. For instance, perhaps customers would accept a lower value of program NPV (i.e. higher levels of network expenditure) for a trade-off outcome that allows a higher level of DER penetration or a different DER outcome that perhaps better engages with local demand-side resources. How can such customer preferences be reflected in business cases and DER integration approaches? Or another way of looking at the challenge might instead ask; *"What approaches will best incentivise the long-run, active participation – rather than defection – of DER owners in the shared resource provided by network?"*

resources, to function in a whole-of-system manner for reliable and cost-efficient service to be provided. This will require more sophisticated approaches to the dynamic coordination of these energy resources, regardless of their location, to support supply/demand balance over timescales from days to milliseconds.

DER adoption will continue to grow as customers continue to exercise their desire to manage their own energy costs, participate in new markets enabled by their investments and help address environmental impacts. We consider that the flexibility offered by DER capacity to the energy system in the future will provide both the systems and customers with increasing value, flexibility and resilience, but only if this capacity is leveraged and rewarded appropriately. From this perspective, the DER Integration consultation may not go far enough in considering the value that DER services and flexibility could present to the energy system. The current approach, by limiting the perspective to lowest net cost network investments, does not allow customer preference (and investment decisions) to determine the extent to which DER should play a role in the future energy system, or the extent to which customers support displacement of centralised generation or increased network investment to support these desires. Only when customer perspectives can be understood in more detail can a true value of DER be understood and apportioned fairly across the energy system.

Development of the Customer Export Curtailment Value (CECV) will require careful consultation

While we appreciate the desire to provide guidance on a value that can be fairly applied in consideration of DER investment cases, we note the significant importance and potential impacts of developing the proposed CECV. We commend the acknowledgement of the need to address customer value lost in curtailing customer export and note the important linkages to Access and Pricing reforms.

Flexibility and transparency are key

The requirement of a DER strategy is very welcome as this will transparently indicate how networks are generally approaching DER integration and how different investments and programs will work together as the industry transitions toward a high-DER future. We strongly support the focus on transparent processes that allow customers, their agents, customer advocates and the AER to assess the different approaches to DER integration and investment that are emerging across networks. The draft Guidance Note's suggested approach will provide transparency such that industry can learn from emerging approaches as networks seek to enable customer DER value.

As noted earlier, we generally support a principles-based approach to DER integration guidance especially as this will allow a range of approaches to DER integration to emerge with transparency. However, we are concerned that the RIT-D approach outlined will not appropriately encourage networks, and other industry parties, to fully explore demand-side opportunities at scale or at a pace commensurate with the wider transformation. Sound investment decisions increasingly require more sophisticated means for evaluating the range of plausible futures for particular network segments. This is because 'democratised' customer investment decision-making will continue to change over time, supported by the rapid evolution of DER technologies and business

models, which will continue to profoundly impact the veracity of any supporting integration investments.

Naturally, this creates a level of ambiguity for network planners that was unimaginable in past decades. With solutions and applications for DER (and demand side flexibility) integration still emerging (and still growing) it is critical to ensure that any approach to considering DER investment remains flexible and adaptable. We consider that the RIT-D process is quite rigid in that it does not cater for different solutions to emerge over time with a degree of uncertainty, being reliant on a degree of foresight in the manner in which RIT-D style financial analysis occurs. The RIT-D NPV process assumes that all likely outcomes are known (anticipated or assumed) today and built into the investment assessment cost model. However, it is doubtful whether such an approach will be adequate in the increasingly varied operational context described above. We are concerned that this approach is likely to perpetuate historical approaches to network design and demand growth that may not appropriately capture the more probabilistic approach that will be required to appropriately manage the uncertainty we described earlier.

CutlerMerz and CSIRO identified the difficulty in determining the future benefits of DERs in their VaDER report. What we recognise and are attempting to highlight here is that networks lack experience with successfully applying non-network solutions in the face of increasingly variable and unpredictable future network conditions. We therefore recommend that any RIT-D type DER investment cases should state how such uncertainty has been considered and addressed – particularly in relation to leveraging the potential growth in demand-side flexibility and capability. We consider that it is likely that DER capability and investment will emerge gradually with subsequent developments building on those that have been applied previously exploring how such gradual developments could be captured in approaches to network transformation.

Additionally, new emergent solutions and approaches are likely to mature over time, allowing industry to learn gradually as different approaches are explored. We suggest that the AER give further consideration to how such investment evaluation processes may better support the need for foresight and agility to address the uncertainty as outlined above. As stated earlier we are also concerned at the apparent low-success rate of previous RIT-D processes in avoiding or delaying traditional network investments. As DER (and demand side flexibility) capacity grows it is our recommended expectation that traditional network investments will be supported by increased procurement of non-network services from customers – in turn providing new value and incentives to customers. We suggest that more weight be given to customer preferences to encourage appropriate effort is given to increased opportunities to engage with customer DERs (and other flexible demand side technologies) to provide more efficient localised solutions for the communities they serve.

Addressing customer expectations requires continued effort

As noted in the CutlerMerz and CSIRO report, dynamic operating envelopes and dynamic constraint approaches are emerging as a flexible approach that will both maximise DER operation and manage network conditions. We consider that further work is required to assess how operating envelopes can enable this capability. Additional work is required to ensure that any such capability is implemented in a fair and equitable manner and until this is established such solutions should not be relied upon to address desired customer flexibility. It is also important to ensure that such reforms are linked to Access and Pricing reforms to ensure that customers are rewarded fairly for participation in such flexibility or curtailment programs. As we note earlier, customers and their agents (such as aggregators and retailers) may desire to use the growing range of technological solutions and demand side resources to balance or optimise outcomes for customers and communities. This includes customers balancing onsite resources, including demand-side (load) flexibility, along with DERs to achieve a range of outcomes.

We are concerned about the AER's suggested direction to assume that DERs are allowed to trip as a base case from which to assess DER related investment and expenditure. To be clear we do not feel it is best for customers to allow DERs to trip as a foundational starting point from which to meet customer expectations. In our view this does not meet minimum customer expectations for system operation and DER integration. Demand-side flexibility and capability will provide a range of potential solutions that may address this challenge with minimal cost implications. It is incumbent on us as an industry to work with customers to explore these in consultation with customers.

It is important that industry supports the creation of flexible demand solutions such that customers can easily participate in such markets while maximising personal value. However, it is important to note that is not only up to networks to encourage customers to ensure their DERs are employed efficiently and effectively in such programs.

Additionally, some broad issues such as interoperability continue to erode the value that DERs and demand side flexible resources will be able to provide to the system. No single party seems to bear responsibility for addressing these and other related challenges, which could result in fragmentation of decentralised benefits and inadvertent customer 'lock-in' to technology platforms that may limit their ability to deliver services to the energy system (and therefore limit the value they can derive from such investments). While we are aware of work underway to address these issues within ARENA's DEIP program, how can such issues be addressed more transparently in efforts to maximise DER penetrations (such as those outlined in the AER's DER Integration Guidance consultation). This is another reason we support a degree of flexibility being applied to DER integration efforts which are likely to evolve over time as such challenges are overcome and as integration capability grows.

Valuing the capability of demand-side flexibility to moderate power system expenditure

With the growth in demand-side flexibility, we caution that the traditional 'centralised' power system paradigm that may unconsciously dominate the perspective of many in the sector may gravitate against the value that can be derived from this growing resource. Rather than viewing customer resources as a challenge to be managed, we encourage the AER to formalise models that require the pro-active leveraging of demand-side resources as a key part of the DER integration solution set.

This is also important as decisions are made about both system value and the value available to consideration of avoided costs due to DER enablement. A customer centric perspective might consider how to maximise DER penetration rather than ascribe an avoided generation cost based on central projections of generation and transmission requirements. For example, should distributed solar PV be compared against centralised PV average costs or should centralised generation costs be reduced based on likely PV penetrations?

Without a fundamental shift away from the centralised-system-planning perspective, we share the Brotherhood of St Laurence's[5] previously identified concern that the proposed *"method's comparison of new rooftop solar capacity vs new large-scale solar capacity may not account for the transmission investment costs associated with the latter".*

A customer-centred perspective to system transformation would seek to maximise the value of customer-side resources and demand-side flexibility and ensure that the system investment mix supports this perspective. Failure to do this will risk either an overinvestment in centralised resources and infrastructure and/or an underinvestment in capacity to support localised customer resources and investments. For this reason, we suggest that this consultation and AER Guidance Note should encourage an increased focus on demand-side resources and the value they can provide to customers and the entire system.

[5]https://www.aer.gov.au/system/files/Brotherhood%20of%20St%20Laurence%20%E2%80%93%20Submission%20to%20value%20of%20DER%20%E2%80%93%20September%202020.pdf

Appendix A: About the Authors

Mark Paterson, Chief Strategy Officer & Managing Director Australia

Mark leads Strategen's global strategy and is a recognised leader of whole-of-system transformation with 20-years of experience in energy systems, building services and applied science. At CSIRO Mark chaired the Future Grid Forum and program directed the Electricity Network Transformation Roadmap. At Horizon Power and Energex he led the development of Australian and world-first technology innovations. He is a key architect of co-design methodologies that engage hundreds of often conflicted stakeholders to navigate wicked problems to develop shared transformation pathways. Mark is Co-Chair of the CEC Distributed Energy Leadership Forum, Fellow of the Pacific Energy Institute and Associate of the GridWise Architecture Council (US Dept. of Energy).

John Phillpotts, Senior Director

John is an energy strategy expert with deep knowledge of strategic planning and regulatory reform in the context of the transformational environment facing electricity distribution networks. John has broad experience working with and within electricity networks in a range of strategy and future network functions considering challenges emerging through market transformation and technological disruption and exploring how these are creating new opportunities for electricity networks to better serve their customers.