energy networks association

THE NETWORK VALUE OF DISTRIBUTED GENERATION INQUIRY

Response to Essential Services Commission's Discussion Paper

29 July 2016

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EXECUTIVE SUMMARY

The Energy Networks Association (ENA) welcomes the opportunity to make a submission to the Victorian Essential Services Commission (VESC) in response to the Distributed Generation Inquiry Stage 2 Discussion Paper – The Network Value of Distributed Generation.

The ENA considers that this review represents an important opportunity for developing understanding of robust methodology for evaluating the system wide net benefits of distributed generation, and to promote an efficient integration into electricity distribution networks.

This review is taking place in the context of a series of separate but directly related inquiries that are considering the value of solar generation. The Queensland Productivity Commission has recently completed an inquiry into Solar Feed-in Pricing in Queensland. The Australian Energy Market Commission (AEMC) is currently considering a Total Environment Centre Rule Change Request on the introduction of the Local Generation Network Credits under the National Electricity Rules.

Members of the ENA support efficient deployment of distributed generation within networks because it can have material benefits to both consumers and energy networks under the right circumstances. The ENA considers that continuing implementation of network tariff reform is the best way to ensure that network costs associated with demand are recovered more efficiently and the customers are charged a price that reflects the efficient costs of providing the service. Network tariff reform, moreover, will lead to more economically efficient signalling and integration of the full suite of distributed energy resources, including solar PV, other distributed generation, storage, and demand response, into the network.

Following this consultation process, the VESC will recommend any changes to the regulatory framework that may be necessary to better account for the network value of distributed generation in Victoria. The ENA considers that national policy instruments are generally better suited to effectively target potential benefits of distributed generation. Having overlapping national and state frameworks may result in duplications, red-tape, inefficiencies and potentially conflicting outcomes. It is not apparent that there are any Victoria-specific circumstances that should be taken into account.

The ENA notes that there are now a number of mechanisms within the regulatory framework that facilitate integration of non-network solutions if it is cost effective to do so, including mechanisms which provide for compensating embedded generators where network access to services from these sources would be more efficient than augmenting the network. As mentioned above, the AEMC is currently considering whether any changes to the existing framework are warranted in its assessment of the Local Generation Network Credits rule change. The ENA considers these mechanisms and the rule change process underway represent a more efficient and effective way to target potential benefits of embedded generation.

BACKGROUND

The Energy Networks Association (ENA) is the peak national body representing gas distribution and electricity transmission and distribution businesses throughout Australia.

Energy networks are the lower pressure gas pipes and low, medium and high voltage electricity lines that transmit and distribute gas and electricity from energy transmission systems directly to the doorsteps of energy customers. Twenty-five electricity and gas network companies are members of ENA, providing governments, policy-makers and the community with a single point of reference for major energy network issues in Australia.

RESPONSE TO DISCUSSION PAPER

APPROACH, CONCEPTS AND DEFINITIONS

The ENA welcomes the clear recognition by the VESC that the capacity of distributed generation to provide network benefit depends on the location of a constraint in the network, the specific characteristics of the distributed generation system and appropriate cost recovery from AER revenue and pricing processes.

The VESC correctly notes that private investment in distributed generation can defer augmentation of Victoria's electricity network, under certain circumstances. This will be the case if it reduces the use of distribution network at peak times when the network is constrained. In those parts of the network where constraints are not imminent and there is no

need for augmentation - there will be no network benefit (at least from deferred augmentation).

Distributed generation may also create additional costs on network businesses. There may be upfront costs associated with facilitating distributed generation connections, as well as costs to networks in managing a range of technical issues relating to power quality and security. In addition, high penetration levels of distributed generation have the potential to result in additional network augmentation. If the network-wide impact of these additional costs exceeds the broadly estimated or assumed network-wide benefits, the overall effect will be to increase network total costs, leading to higher network charges for consumers. Therefore, it is important the analysis focus on net, rather than gross, benefits.

The ENA encourages that the VESC further considers the interaction between any new payment mechanism and the existing regulatory rules, the design of the feed-in-tariff arrangements in Victoria and other market arrangements that may influence the take up of distributed generation, the costs and benefits to networks, as well as broader economic costs and benefits that are relevant to examining whether long term interests of customers are met. To this end, the ENA has identified two risks not considered in the VESC Discussion Paper:

- In some cases, deemed demand reductions from distributed generation and other sources may not be sufficient or not sufficiently low cost to avoid adoption of the least cost network solution; and
- Payment levels may be higher than alternative demand management or other non-network options, crowding out alternative providers and leading to a higher cost solution, i.e. distributed generation becomes preferred over other non-network solutions. Technology neutrality should be maintained to ensure that established market principles are not distorted by favouring one technology (or fuel source) over others.

While it is appropriate to incentivise distributed generation which provides commensurate value in the form of network benefits, the ENA considers that the VESC should be careful to avoid introducing an artificial subsidy which becomes inefficient distortion in the market and harms the long-term interests of consumers.

For these reasons, the ENA considers that timely implementation of network tariff reform is critical to ensuring that network costs associated with demand are recovered more efficiently and the customers are charged a price that reflects the efficient costs of providing the service. Network tariff reform, moreover, will lead to more economically efficient signalling and integration of the full suite of distributed energy resources, including solar PV, other distributed generation, storage and demand response into the network.

The more effective the economically efficient integration of distributed energy resources into the network, the greater the opportunity to realise net network benefits from distributed generation, while ensuring grid resilience and reliability for the ultimate benefit of consumers.

ECONOMIC VALUE METHODOLOGICAL APPROACH

The ENA has reviewed the VESC-proposed principles that a distributed generation methodology is required to satisfy. The ENA considers that these principles are broadly adequate. In particular, the VESC has suggested that such a methodology should be able to:

- identify whether the circumstances under which distributed generation can provide value exist in a given location and a given point in time,
- identify the characteristics of distributed generation that are required to give rise to benefits in that location and at that time, and
- identify a way of calculating the value of any such benefits (or potential benefits) that are identified.[1]

It is important that a methodology for measuring value of distributed generation focuses on net, rather than gross benefits and the value of any avoided cost is considered over time (long-term value). As discussed in the previous section, in some circumstances distributed generation can impose incremental costs on the network which should be taken into account if an efficient economic outcome is to be achieved.

The VESC suggests that in order to measure the scope of the benefit and its value, the methodology would be geared towards comparing the technical requirements (and therefore costs) of managing the network with and without

[1] ESC, Distributed Generation Inquiry Stage 2 Discussion Paper – The Network Value of Distributed Generation, p.30.

the existence of distributed generation.[2] *Prima facie*, the ENA considers that this approach may be appropriate, as long as it includes the assessment of costs incurred by the businesses. The ENA also notes that the uptake levels of distributed generation are relevant as the uptake levels will drive the underlying costs and benefits that the VESC is seeking to quantify.

The ENA understands that the VESC is still to form a view on whether the value of any identified benefits can be calculated in monetary terms. This is an important consideration as numerous submissions to the AEMC's Local Generation Network Credit rule change consultation process highlighted the difficulty in determining accurately the benefits of small-scale distributed generation.

OPERATION OF THE EXISTING REGULATORY FRAMEWORK

The AEMC has made a number of reforms to the regulatory framework for embedded generation in the recent years, (particularly a number of rule changes from the Power of Choice review). There are now a number of mechanisms within the regulatory framework that facilitate integration of non-network solutions if it is cost effective to do so. These mechanisms include:

- **Connecting embedded generators rules** (Chapters 5 and 5A). A transparent connection process for large and small embedded generators, with defined timeframes and requirements on the part of the distribution network service providers (DNSP) to disclose relevant information enables the efficient connection of embedded generators across the National Electricity Market.
- **Avoided Transmission Use of System** (TUoS) charges. DNSPs are required to make payments to embedded generators that reflect the cost component that would have been payable to the transmission network service provider had an (eligible) embedded generator not been connected to the network. This payment may apply to small embedded generators where the applicant is eligible, and seeks to negotiate, its connection under Chapter 5 of the National Electricity Rules.
- **Network support payments**. Network support payments can be and are negotiated between DNSPs and embedded generators to reflect the economic benefits the embedded generator is providing to the DNSP. Under these arrangements, which are in place across a number of jurisdictions, embedded generation can be contracted by a DNSP to address network constraints. As an example, a single Victorian network business already has direct network support arrangements with embedded generators with an installed capacity of around 60 MW.
- **Network planning and expansion framework**. The current network planning arrangements in the NER require the network businesses to apply the RIT-T and RIT-D before augmenting their networks. These tests require alternatives to be considered to network augmentation, which should include both network and non-network options, including embedded generation.
- **Demand Management Incentive Scheme** (DMIS). This mechanism specifically encourages trials of innovative non-network options by DNSPs that benefit customers through reduced costs over time. While the revised DMIS is expected to be developed by 1 December 2016, electricity network businesses currently deliver innovative projects under the existing Demand Management Innovation Allowance in accordance with demand management objectives. Innovation allowances are currently included within the network determinations applying to all electricity distribution businesses. The ENA has long supported the timely review of this scheme in accordance with the Power of Choice reforms endorsed by COAG Energy Council.
- **Small generation aggregator framework**. This framework reduces the barriers to small embedded generators participating in the market by enabling them to aggregate and sell their output through a third party (a Market Small Generator Aggregator). This makes it easier for these parties to offer non-network solutions, and for DNSPs to procure those options when it is efficient to do so.
- **Service Target Performance Incentive Scheme** incentivises to provide secure and reliable network services. These need to be taken into account when considering the benefits from distributed generation.

[2] Ibid p XIII

The ENA would like draw the VESC's attention to two new developments that need to be considered:

- The AEMC is considering network planning reforms and in a new rule change process that was initiated by the AER. The framework would require network businesses to undertake an economic analysis of all options before replacing assets with a minimum capital cost of $2m. This could potentially include aggregation of small distributed generators.
- The COAG Energy Council endorsed the Energy Market Transformation work program, which aims to ensure that regulatory frameworks are fit for purpose to support changing market structures, as energy sector shifts from a centralised system to a more decentralised one and the energy generation mix changes.

Finally, the AEMC is currently considering a Total Environment Centre Rule Change Request on the introduction of the Local Generation Network Credits under the *National Electricity Rules*.

The ENA considers that national policy instruments are generally better suited to effectively target potential benefits of distributed generation. Having overlapping national and state frameworks may result in duplications, red-tape, inefficiencies and potentially conflicting outcomes. Therefore, the ENA considers the existing mechanisms and the rule change process underway represent an efficient and effective way to target potential benefits of distributed generation.

ANSWERS TO THE SPECIFIC QUESTIONS

Approach, concepts and definitions

Q1. Are there any other aspects of our definition of distributed generation that we should consider, in this stage of the inquiry?

There appears to be an agreement that the NER are effective for larger-scale embedded generators. The Commission's focus on small-scale distributed generations is appropriate. However, the ENA does not consider that there is any established material deficiency in the NER with respect to the treatment of small-scale DG.

Q2. What data and evidence is available about the potential network benefits of battery storage?

The analysis conducted by Frontier Economics on behalf of the ENA in support of the ENA's submission to the AEMC's consultation paper on the Local Generation Network Credits rule change has identified the potential costs and benefits from **combining solar PV with battery storage**.[3] The potential benefits are.

- Avoided augmentation expenditure. Batteries may assist in managing solar PV intermittency and timing of output issues, therefore there is potential to assist meeting peak demand, and to defer or avoid augmentation expenditure.
- Avoided replacement expenditure. Higher uptake of solar PV and batteries could lead to avoided expenditure if batteries reduce variability in the loading of assets.
- Avoided operating costs. Higher uptake of solar PV and batteries could lead to avoided expenditure if batteries reduce variability in loading of assets.
- Avoided electricity losses. Material changes may occur under high uptake. The ENA notes that this is not included in ESC list.

The potential costs are:

- Connection and other facilitation costs. Incremental connection costs are likely to vary across DNSPs, but higher uptake of solar PV and batteries could create material network costs.

In contrast to solar PV in isolation, solar PV combined with battery storage has the potential to lead to peak shifting in a way that reduces costs for distributors and the broader energy market (i.e. away from the evening peak). Similarly, reduced intermittency and day-time output potentially means less need for measures to manage voltage deviations and reverse control issues and therefore lower network management costs.

In absence of solar PV, batteries can still offset individual's consumption during peak periods, directly reducing the peak demand and thus avoiding a network constraint eventuating.

[3] http://www.aemc.gov.au/getattachment/6916f3a3-31d9-457b-8228-5530b64e1fcf/Energy-Networks-Association-Frontier-Economics.aspx

There is no method of tracking battery installations presently in place in Australia and there is no quality data on residential or commercial battery uptake. The Clean Energy Council (CEC) suggests approximately 500 residential systems were installed Australia-wide at the end of 2014.[4]

AEMO's 2016 National Electricity Forecasting Report assumes battery storage becoming economic to the mass market in the 2020s.

Q3. On what basis should the network benefit from distributed generation be assessed – on the total output or on the total exports of the distributed generation system?

The ENA considers that a more appropriate unit rate is a peak kVA structure. In addition, output should be considered rather than exports to capture the onsite usage.

Q4. What do you see as the main differences between network-led and proponent-led DG in terms of the network benefits they deliver?

Proponent-led distribution generation may only lead to network benefit if it is in the right location. Therefore, an efficient price signal or incentive is required to facilitate efficient investment in and use of distributed generation.

Introduction of demand tariffs will incentivise investment in embedded generation (and batteries) which can be used to reduce network peak demand. Customers will be rewarded through lower network charges if they are able to reduce demand on the network during peak times, leading to more efficient outcomes for all customers. Additionally, wide range of pricing frameworks, incentives, rebates and programs, which the ENA has referred to as Second Wave incentives, can be used to target locational areas of constraint in a more dynamic manner. Network tariff reform will therefore inform and encourage efficient decisions and reduce the potential to over compensate or undercompensate different types/locations of distributed generation.

While not relying on the price signal or incentive, network-led distributed generation can be directly targeted to those parts of the network where constraints are imminent and provide better control over dispatch, thereby maximising network benefits.

Q5. Are there any other aspects of our definition of value that we should consider, in this stage of the inquiry?

It is important that a methodology for measuring value of distributed generation focuses on net, rather than gross, benefits.

Q6. Are there any other aspects to our proposed framework for assessing network value that we should consider?

The ENA has no comments on this question.

Q7. Do you agree with the Commission's proposed framework for the network value stage of the inquiry? Are there alternative approaches?

The ENA consider that the VESC's approach is appropriate, noting that that the Commission is still to form a view on whether the value of any identified benefits can be calculated in monetary terms.

Economic benefits

Q8. Beyond those identified in the paper, are there other examples of applied methodologies for calculating network benefit that the Commission should consider?

The ENA considered that analysis conducted by Frontier Economics on behalf of the ENA in support of the ENA's submission to the AEMC's consultation paper on the Local Generation Network Credits rule change may be of assistance to the VESC.[5]

Q9. Can you suggest any alternative or additional categories of network benefits regarding distributed generation?

The VESC appear to have covered the relevant categories of the potential benefits.

The ENA also notes that various distributors are currently undertaking trials to assess customer behaviour and network benefits and further insight may become available over time.

[4] https://www.solaraccreditation.com.au/dam/cec/policy-and-advocacy/reports/2015/150429-Australia-storage-industry-roadmap-FINAL/150429%20Australia%20energy%20storage%20roadmap%20FINAL.pdf

[5] http://www.aemc.gov.au/getattachment/6916f3a3-31d9-457b-8228-5530b64e1fcf/Energy-Networks-Association-Frontier-Economics.aspx

Q10. Can you suggest alternative or additional characteristics of distributed generation (that effect the capacity of distributed generation to provide network benefits)?

The ENA has no comments on this question.

Q11. Are there circumstances in which a fleet or 'portfolio' of passive distributed generation systems can provide suitably firm generation capacity to create circumstances in which network benefit is created?

Distributed generation may have some network benefit due to portfolio effects, but the extent will depend on how diversified the portfolio is and whether it can provide firm capacity at times and locations where generation is needed by the network. For example, multiple solar PV in a single location may have low portfolio value.

Economic value methodological approach

Q12. What alternative or additional building blocks of a methodology should be considered for determining the network benefit of distributed generation?

The ENA considers that the VESC's approach may be appropriate, as long as it includes the assessment of costs incurred by the businesses, i.e. net benefit, not gross benefit.

Other building blocks can include representative customer profiles and distributed generation uptake assumptions. This input may be required to develop a method for identifying the impact of distributed generation on networks.

Q13. What do you see as the most appropriate unit of analysis and level of granularity for the assessment of network benefits?

The Commission appears to refer here to the broad categories of transmission and distribution network, and also the specific sub categories, such as terminal stations, zone substations, transformers, and the various types of feeders that connect them.

There is the need to balance accuracy and simplicity and the potential to over compensate or undercompensate different types/locations of distributed generation. The ENA notes that the potential benefits will differ between urban and rural locations, small commercial and residential customers and whether a constraint exists in a given location.

Q14. What publicly available data sources can be accessed to apply the methodology, particularly with respect to network constraint and demand?

The VESC's report provides a comprehensive list of data sources.

The ENA notes that the Institute of Sustainable Futures has launched new Network Opportunity Maps, which are available here: http://nationalmap.gov.au/renewables/

Q15. What are the appropriate time parameters of a study into the potential network benefits of distributed generation?

The ENA has no comments on this question.

Environmental and social benefits

The ENA does not comment on this group of questions at this stage.

Q16. Can you suggest or provide evidence that supports those environmental or social benefits attributed to distributed generation listed in this discussion paper?

Q17. Outside those potential benefits listed, are you able to provide (and support with evidence) of how distributed generation reduces the environmental impact of the transportation of electricity?

Q18. Outside those potential benefits listed, are you able to provide (and support with evidence) examples of how distributed generation provides social benefit, as it relates to the transportation of electricity?

Operation of the current regulatory framework

Q19. Are there other aspects of the current regulatory framework outlined in this paper that the Commission should consider?

The Service Target Performance Incentive Scheme and the Guaranteed Service Level (GSL) incentivise provision of secure and reliable network services. These need to be taken into account when considering the benefits from distributed generation.

Q20. Can you provide specific examples of payments made to distributed generators under the regulatory mechanisms listed in this discussion paper? What size of distributed generation systems received the payments? Were payments made to small-scale systems?

The ENA understands that member businesses will provide answers to this question in their individual submissions.

Q21. Are you able to provide data/evidence about the operation of the small scale generation aggregator framework as a mechanism by which network benefits of small scale distributed generation can be identified, valued and compensated?

The ENA understands that member businesses will provide answers to this question in their individual submissions.

Q22. To what extent do the Tariff Structure Statements published by Victorian distribution businesses provide an indication of the benefit distributed generation can provide through reducing peak network demand?

In the Victorian TSS proposals, more cost reflective signals are provided in tariffs on an opt-in basis for residential customers, and a stronger approach is used for customers consuming more than 40MWh pa. Also, the new proposed tariffs reduce cross-subsidisation created by energy based tariffs between customers.

Q23. Are there are alternative conceptual frameworks that could be used to examine the benefits provided by proponent-led distributed generation? In particular, are there conceptual frameworks for considering potential benefits that were not anticipated in the planning forecasts associated with the five yearly pricing determination process?

The ENA has no comments on this question.

Alternative mechanisms

Q24. How should the Commission consider the scope of the LGNC Rule Change Proposal with this current inquiry?

The ENA considers the existing mechanisms and the rule change process underway represent an efficient and effective process for evaluating potential benefits of distributed generation.

Furthermore, numerous submissions to the AEMC's LGNC consultation process highlight the difficulty in determining accurately the benefits of small-scale distributed generation. An accurate calculation of avoided costs would need to take into consideration the generator type, size, connection voltage and location. The value of any avoided cost over time should also be considered. This level of calculation should be carefully assessed and fit for purpose so as to ensure is does not cause unnecessary complexity, cost or market distortion.

Q25. Are there methodologies for calculating network value and/or regulatory mechanisms from any other jurisdiction that are suitable for consideration in the context of this inquiry?

In its response to the LGNC rule change the ENA considered schemes or export credit arrangements in place internationally. The analysis highlights that the challenges associated with developing a robust methodology have not yet been adequately overcome. Rather, international experience demonstrates that regulators are increasingly seeking to, as a first step, recognise and fully assess the full range of costs and benefits from embedded generation.