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Steven Graham
Chief Executive
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

Dear Mr Graham

Proposed Rule Change – Connecting Embedded Generators, Reference ERC0147

The Australian Energy Market Commission (AEMC) has sought comment on the ClimateWorks Australia et al. "Proposal to amend the National Electricity Rules for connecting embedded generators" (Rule Change Proposal). EnerNOC appreciates the opportunity to contribute to this stage of the Rule Change process. EnerNOC has expertise in registering embedded generators in the NEM, and registering operating embedded generators for demand response purposes in numerous other markets.

General comments

Over the past eight years EnerNOC has outfitted customer-owned distributed generators in most NEM jurisdictions as sources of demand response (where these generators take part or all the customer load off the grid, or export onto the distribution network, in response to a range of NEM events) and for economic dispatch (where these generators are registered as market generators and are able to respond quickly to high prices in the NEM).

We applaud the intended harmonisation to be brought about by the proposed changes to Chapter 5 and are pleased to note the Rule Change Proposal recognises that connection barriers exist, and must be resolved, for all embedded generators, not just co/trigeneration projects. We strongly endorse these proposed changes being applied to all embedded generators.

These proposed rule changes, together with the Small Generation Aggregator Framework, should enable embedded generators to play a more significant role in the NEM than they currently do. Embedded generators already provide a level of insurance to electricity users who rely on their electricity supply for security and safe shutdowns. When registered as market non-scheduled generators they can also increase the economic value to the generator owner and to the market. Under improved connection arrangements embedded generators will make a more significant contribution as part of the suite of assets for managing the electricity supply in the future, including providing cleaner energy and more efficient network investment.

It is in everyone's interest to ensure that all types of embedded generators can be more readily connected to the network through a nationally consistent prescribed or standard process with clear guidelines, improved transparency, defined response times and reasonable cost. The current ad hoc

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processes require excessive, inefficient effort from both DNSPs and generator proponents, without producing a good outcome.

Standardisation of technical requirements is important, as it can significantly reduce costs and uncertainty. For protection systems, in particular, it would be a mistake to create a new, NEM-specific technical standard, as this would require protection equipment to be designed, manufactured, and certified specifically for Australia – all sources of additional, unnecessary cost. It would be greatly preferable to adopt protection requirements from another region, such as the requirements for sub-5MW plant under UK Engineering Recommendation G59/2. This way, it should be possible to buy suitable integrated protection equipment off the shelf.

Whether the generator is constantly running, such as a co- or tri-generator, or is a standby generator (which may also be contracted to participate in a demand response program, or registered for economic dispatch) there should be no discrimination or difference with regard to the connection process. Importantly, all embedded generators must be afforded the same connection process anywhere in Australia to maximise the overall reliability and efficiency of the power supply in line with the requirements of the NEO and to contribute to a cleaner environment.

As part of the connection process these generators must be allowed, at reasonable cost and within a reasonable timeframe, to either temporarily ("soft sync") or continuously synchronise with the grid to avoid transitory power outages when switching to the generator from the mains, and vice versa. The three main reasons for this are:

- we live in times when computing capabilities appear ubiquitously in society with computer chips embedded in all manner of appliances and equipment, sometimes oblivious to the consumer – oblivious that is until the power goes out.
- on-load testing of some generators is impossible because they have been connected in such a way that the mains must be disconnected or blacked out before the generator can start (this configuration is often dictated by the network service provider as a precondition to approving the connection agreement)
- in some locations, where the generator backs up a commercial building or apartment complex, the building lifts must be lowered and stopped at a convenient floor before switching over to the standby generator. This causes unnecessary cost and inconvenience to the customer/building manager and tenants and inhibits the regular exercise of the emergency generator.

To achieve an effective change we believe will require two significant actions, viz, the Rule changes as proposed and a strengthening of the regulatory process to make it stronger and more pro-active. The latter will be required to:

- ensure that decisions made by the networks about embedded generators are in line with the objectives set in the NEO, and
- ensure that specific timelines are met and charges reflect efficient costs.

The networks must be required by the Rules to support the most efficient outcome for their electricity supply area. This level of efficiency can only be achieved if network planning information identifying "hot spots" is readily available well in advance of the network committing to a decision.

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This will enable potential investors and other third parties to propose solutions to the network so they have a range of options to consider.

Responses to Questions

Question 8 – Terms and conditions of connection

(b) In what ways are varying terms and conditions between distributors a problem? Is it appropriate for distributors to have different terms and conditions? Does this reflect relevant differences in network requirements?

The current problem is not just that each DNSP has different terms and conditions, but that the terms and conditions are sometimes made up on the fly, and are not subject to scrutiny. For example, we know of one case in which the DNSP inserted into a proposed connection agreement for a site with embedded generation a clause specifying that the generators must not be registered as market generators. Whether a generator is registered as a market generator has no bearing on the DNSP.

Question 9 – Technical standards for embedded generators

(a) Without technical standards currently being in place for embedded generators, how well has the connection process under Chapter 5 worked in practice? How urgently are standards needed?

The very low proportion of embedded generators in the NEM which are allowed to synchronise with the mains indicates that there is a problem with the current process. Distribution network engineers from overseas have expressed astonishment at finding so many projects in which generators are not synchronised, since synchronised generators are so much more useful.

EnerNOC's experience, like that of many other generation project proponents, has been that the process of agreeing technical requirements with DNSPs has been slow and unpredictable. It has been difficult to ascertain the technical justification for some of the requirements. This makes the process much more expensive and likely to fail. No cost-risk-benefit trade-offs seem to be considered by the DNSPs in line with meeting the NEO.

(b) Would standards for different types/classes of embedded generators be required?

Yes, but not all that many. We suggest they could be broken into two classes by size, with the threshold at 5MW, to align with the threshold for the existing standing exemption from registration. It may make sense to also distinguish between some broad classes of generating technology, since different technical characteristics can affect the protection requirements.

(c) What factors should be taken into consideration in developing such standards? Are there any specific jurisdictional or local requirements?

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The important point is to avoid creating a new standard, when it should be possible to adopt an already-proven standard, such as the UK's G59/2. This is not only to avoid a lengthy standard-setting process, but more importantly to allow standard equipment to be used, rather than new equipment having to be developed to meet some unique new Australian standard. The market for micro-embedded generators is large enough to support an Australia-specific standard (AS 4777). The market for larger embedded generators is not.

(d) What should be the scope of such standards? Can all relevant technical requirements be 'standardised'?

As broad as possible, and definitely covering protection requirements as this is the area in which lack of standardisation leads to excessive costs.

Question 10 – Embedded generators having an automatic right to export to the grid

(a) Under what circumstances have embedded generators not been allowed to export electricity to the network?

The issue is not only restricted to preventing exports. We are aware of cases in which DSNPs have indicated that generators would not be allowed to parallel with the grid at all, even for the few seconds required for Synchronise-Close-Transfer-Trip ("SCTT") operation. One such refusal, by a DNSP in Victoria, was based on fault level considerations. The same situation, with the same fault level headroom, would have been permitted by NSW DNSPs.

(b) What are the impacts on embedded generators and other participants when exporting is not allowed?

In some cases, projects are abandoned because they are no longer viable. In others, the complexity of the switchgear increases considerably, so as to allow partially-islanded operation. The same issues can arise even for generation projects which were not intended to export to the grid, but do require the ability to synchronise – either permanently, or for SCTT operation.

(c) Are there circumstances where the ability of embedded generators to export electricity to the network should be limited? What conditions could be reasonably imposed to limit exporting?

If restrictions are to be imposed (on anything other than a temporary basis, e.g. safety for maintenance work) this should be defined in the Connection Agreement between the generator operator and the network operator, and subject to oversight. Such arrangements should be exceptional, due to particular issues with specific parts of the network; regulatory oversight should ensure that DNSPs' normal behaviour and design practices does not lead to the prohibition of synchronisation of or export from embedded generators.

(d) What are the costs and benefits of allowing, and not allowing, embedded generators to export electricity to the network?

The electricity system is inevitably moving towards a more decentralised model. It makes no sense for DNSPs to try to hold back the tide. If they were to succeed, it would simply lead to an increasing proportion of electricity users being off-grid altogether. In the longer term, this would strand network infrastructure and increase already high network costs for remaining customers.

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(e) Is there any basis for embedded generators to be treated differently to load or other generators? For what reasons?

No. Hence there is no reason to charge embedded generators deep augmentation costs.

Question 12 – Shared network augmentation costs

(b) Should embedded generators (noting that embedded generating installations can encompass a broad range of installations) be exempt from paying shared network augmentation costs? Why or why not?

Yes. Embedded generators can and should be part of the operational system which will lead to a more efficient electricity supply network. At present the generators appear to be seen as a nuisance. This attitude needs to be changed as we move to a smart grid operation which will take into account available generation options and demand response options in coordination with the built network.

(c) If embedded generators are exempt from shared network augmentation costs, how should these costs be allocated?

If the networks consider the full financial benefits of appropriate generation and DR there should not be any net costs that need to be allocated. To the extent that there are, they should be allocated as they are for new load connections.

Section 5.5 – Distributors publishing annual reports

The AEMC suggests that the distribution and network planning and expansion framework rule change is likely to mandate the necessary information provision. We would like to emphasize the importance of including all information relevant to generation proponents, such as the fault level headroom in each area, and what the DNSP is planning to do to rectify it, if it is too low.

Yours sincerely,

Paul Troughton
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EnerNOC Pty Ltd