



17 June 2021

Ms Anna Collyer  
Chair  
Australian Energy Market Commission  
GPO Box 2603  
Sydney NSW 2000

**Re: ERC0300 Efficient management of system strength on the power system**

CitiPower, Powercor and United Energy welcome the opportunity to respond to the Australian Energy Market Commission's (AEMC) draft determination relating to efficient management of system strength on the power system.

In general, we support the consideration of a more efficient connection process, as well as better processes for co-ordination between the connecting network service providers (NSPs) and generators for system strength. However, we consider the draft determination could benefit from:

- providing a flexible framework where system strength can be provided at any location where it is needed the most, including at both the transmission and distribution levels of the network
- ensuring distribution-connected generators are not disadvantaged, nor inefficiently encouraged to connect to the transmission-level of the network
- explicitly allowing distributors to provide system strength solutions now, to future-proof the regulatory framework
- supporting distributors to trial new solutions to address system strength issues.

System strength issues may arise on our meshed sub-transmission network in the near future. Accelerating penetration of distributed energy resources (DER) together with increasing exports from large renewable generators means the distribution systems' ability to respond to faults may decline over time.

The distribution network is a great place to trial possible new solutions to the system strength issue. An increasing interest in grid-scale battery connection to the distribution network creates prime opportunities to further develop grid-forming inverters as a more cost-effective long-term solution. A flexible framework where these batteries can be included close to the distribution network load would provide a range of network benefits including network control, supply security and system strength. Trialling this technology on a small-scale on the distribution network could also provide key learnings before deploying this technology at a broad scale on both transmission and distribution networks.

**Allow system strength to be provided where it is needed**

The AEMC should ensure the regulatory framework is flexible enough to allow system strength solutions to be provided where they are needed. Unfortunately, the draft determination reiterates the AEMC's previous finding that system strength should be supplied as a prescribed transmission service.

Under the draft determination, connecting parties would face a choice between:

- paying the charge to utilise the system strength provided by the designated system strength provider (which is the Australian Energy Market Operator (AEMO) in Victoria) or
- undertaking their own remediation actions behind their connection point.

The AEMC recognises that parties who connect close to system strength nodes should face charges that are lower than the costs of self-remediation, and are therefore likely to pay the charge.<sup>1</sup> Those parties that choose to locate further away would face higher charges, and may elect to either self-remediate or abandon their project.

This proposal may disadvantage generators seeking to connect to the distribution network. Allowing system strength remediation solutions to be provided on both the distribution and transmission networks would provide the following advantages:

- a fleet of smaller synchronous condensers on the distribution network would provide greater redundancy and reduce the number and frequency of generator constraints in the event of synchronous condenser outages or failures
- issues on the sub-transmission network can be most efficiently addressed at the sub-transmission level. Locations on the transmission network may not be able to be found to provide an equivalent solution at a comparable cost
- generators would not be disadvantaged in their access to system strength solutions if they can be provided at either the distribution or transmission levels of the network. If new system strength is provided via dedicated transmission connections these will be more electrically 'distant' to distribution projects required to call on them, increasing costs and further disincentivising distribution connections.

If the distribution network is the best place to address a system strength need, then it should be permitted under the regulatory framework. As distributors can provide system strength solutions in an efficient, reliable and distributed manner, they should not be precluded from supplying that solution.

### **Ensure distribution-connected generators are not disadvantaged**

The AEMC's draft determination should not artificially and inefficiently disincentivise generators from connecting to the distribution network. This would be contrary to the National Electricity Objective.

In Victoria, the solution provided by a system strength provider will likely be at a terminal station, or elsewhere on the transmission network. The AEMC has previously noted that a system strength solution can be placed in the distribution network by a System Strength Service Provider (a Transmission Network Service Provider, TNSP) through the joint planning process between TNSPs and distributors.<sup>2</sup> Under the draft determination, most if not all system strength solutions will be placed in the transmission network since it will be easier for the TNSP to do so and given the system strength nodes defined by AEMO are all on the transmission system.

Generators may inefficiently be encouraged to connect to the transmission network. As noted above, if system strength is only delivered by dedicated transformers to the transmission network, the benefits would be reduced for any distribution-connected generator.

### **Allow distributors to provide solutions now to future-proof the regulatory framework**

To deliver a holistic and future-proof system strength framework, the AEMC must allow distributors to be able to provide solutions now given we will need to in the future. Therefore, the AEMC should explicitly allow system strength to form part of a distribution service, where the costs can be included in the regulated asset base (RAB).

System strength issues may arise on our meshed sub-transmission network in the near future. Accelerating levels of DER on our low-voltage network combined with increasing number of large-scale renewable generators exporting to our high-voltage networks means the distribution systems' ability to respond to faults may decline

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<sup>1</sup> AEMC, Efficient management of system strength on the power system, Draft rule determination, 29 April 2021, para 67.

<sup>2</sup> AEMC, Investigation into System Strength Frameworks in the NEM, Final Report, 15 October 2020, pp. 90-97.

over time. Distributors need to be able to address this as it arises, and for it to form part of the distribution service.

Distributors must also be allowed to offer efficient system strength solutions to generators connecting to our network. Distributors know where generators are intending to connect to their network and could also co-ordinate the system strength requirements of multiple projects to provide an efficient solution in terms of scale and scope at a combined location. Alternatively, distributors could provide for multiple generators over time using scalable system strength solutions delivered within their networks.

We are well placed to manage system strength issues on the network. Powercor was heavily involved in resolving the system strength issue that impacted four generators connected to our sub-transmission network, in the “West Murray Five” incident. Our teams have demonstrated their expertise to investigate and address system strength issues including the complex process of inverter control tuning across multiple generator sites.

Similar to any other NSP, we have full capability to perform system strength studies and propose efficient and effective solutions. Furthermore, our capability in detailed electromagnetic transient (EMT) modelling has been improved significantly to manage connection applications since the introduction of the System Strength Impact Assessment Guidelines.

System strength solutions should not be ring-fenced away from distributors. The AEMC proposes to block distributors from supplying this co-ordinated and efficient level of system strength, but has failed to articulate any clear reasons why. In Victoria, this amounts to an arbitrary block on distributors providing system strength solutions on the distribution side of a 66kV transmission connection. Yet a TNSP operating assets at the same 66kV level would be able to provide a solution only metres away.

#### **Support distributors to trial new solutions to address system strength issues**

The AEMC should support distributors in trialling innovative system strength solutions on the network, such as grid-forming inverters combined with storage. Batteries provide a range of network services and will become a key asset in distribution networks in the future.

Grid-forming inverters combined with storage are emerging as an exciting alternative to synchronous condensers. While synchronous condensers are recognised as an older technology that can be used to manage system strength issues, recent events in Queensland have highlighted their limitations in terms of interacting with other network assets and customers equipment. Grid-forming inverters together with storage, in the form of a battery, could provide a range of benefits to distributors:

- supply security
- alleviate thermal constraints
- assist in managing minimum demand by storing DER and solar/wind generation
- voltage stability
- harmonic dampening
- address inertia shortfalls
- support system strength.

Customers would benefit from improved network reliability with fewer outages as the grid transitions to a greater reliance on renewable energy from intermittent generators.

Ring-fencing us from providing system strength solutions is problematic, as batteries will form a key asset in our network in the future. In discussions with AEMC staff, it has been proposed that an affiliated entity of the distributor could provide system strength to the connecting and prospective generators. However, this proposal is flawed:

- the distribution ring-fencing guideline prevents us from disclosing confidential information to any person, including a related electricity service provider, except in certain circumstances<sup>3</sup>
- even if a distributor were to propose to co-ordinate procurement of system strength on behalf of connecting and prospective generators, the funding for the tender would be challenging as the AEMC's position appears to be that a distributor could not contribute financially.

Distributors should not be arbitrarily blocked from trialling system strength solutions on the distribution network. Small-scale battery trials could provide key learnings before deploying this technology broadly across both distribution and transmission networks.

Should you have any queries, please contact Elizabeth Carlile on 0419 878 852 or [ecarlile@powercor.com.au](mailto:ecarlile@powercor.com.au).

Yours sincerely



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<sup>3</sup> Refer clause 4.3.3 of Australian Energy Regulator, Ring-fencing Guideline – Electricity Distribution, version 2, October 2017.