Green Power

Enel Green Power Australia Pty Ltd
Level 23.07, One International Towers
100 Barangaroo Avenue
Sydney NSW 2000

John Pierce
Australian Energy Market Commission
201 Elizabeth Street
Sydney NSW 2000

12 May 2020

Dear John,

INVESTIGATION INTO SYSTEM STRENGTH FRAMEWORKS IN THE NEM (EPR0076): DISCUSSION PAPER

Enel Green Power (EGP) welcomes the opportunity to respond to the Australian Energy Market Commission's (AEMC's) Discussion Paper, "Investigation into System Strength Frameworks in the NEM."

Founded in 2008, and part of Enel Group, EGP builds and operates large scale renewable generation capacity in energy markets around the world. EGP operates in 29 countries on 5 continents with a managed capacity of over 43 GW and over 1,200 plants. EGP is the largest renewable energy company by capacity in the world, generating approximately 99 TWh of renewable electricity from hydro, solar, wind and geothermal resources

This is an important consultation, given the connection and curtailment issues being experienced in parts of the NEM. Interactions between the system strength frameworks and the connection process lie at the heart of these issues. Aspects of the existing system strength frameworks have made the connection process complex, onerous and unpredictable, causing ongoing delays and frustration for developers. These issues must be resolved as they are undermining incentives to invest and risk bringing the renewable energy transition in Australia to a grinding halt.

While greater familiarity and experience with complex technical issues and modelling processes by all stakeholders involved in the connection process will help address these issues, changes to existing frameworks are also necessary. That said, EGP considers incremental rather than wholesale changes to existing frameworks will be sufficient.

Specifically, the "do no harm" framework could be enhanced by introducing system strength specific performance standards. We propose two new automatic performance standards are introduced based on Models 3 and 4 described in the Discussion Paper.

Further, while the Minimum System Strength Framework is largely appropriate, planning horizons should be adjusted to create a stronger link with the Integrated System Plan (ISP), which now takes future system strength needs into account.

EGP considers these changes will achieve an appropriate balance between maintaining a strong grid and keeping costs reasonable for consumers. Automatic access standards based on Model 3 and Model 4 should encourage innovative solutions to system strength while providing a route to a simpler, more certain and speedier connection process for renewable developers.

Our views are expressed in more detail below.

Issues with current frameworks

In its discussion paper the AEMC has articulated many of the key issues of current system strength frameworks, which may be briefly be reiterated as:

- The system strength frameworks are actually still quite new, and there has been a process of "learning by doing" for all involved, particularly with respect to understanding the technical impacts of low fault levels and the application of a complex modelling techniques required for system strength assessments.
- The minimum strength framework has not been working well to date - shortfalls have been called too late in order to avoid costly directions for system strength in SA or curtailment of generators in Victoria and North Queensland. It is not clear whether this has been due to issues intrinsic to the framework itself or the manner in which it has been applied.
- The "do no harm" framework has also been problematic to date. It has created a complex, onerous and opaque, assessment process, with connection applicants lacking access to necessary information to adequately perform their modelling. EGP understands that these issues are now being addressed by AEMO developing a version of its whole of system network model that is accessible to connection applicants (specifically their consultants). It is critical that connection applicants have a comprehensive view of the performance of all committed projects nearby to ensure their own modelling is meaningful and relevant for system strength assessments.
- Modelling requirements are also highly time consuming and repetitive. Assessments must continuously be redone over the course of a connection process as system conditions change. System conditions and the consequential modelled level of system strength can change frequently due to the high volume of new entry in certain parts of the grid. While the complexities of the modelling process are to a large extent unavoidable due to the physics of weak grids, a more simplified faster process should be available for more 'grid friendly' connection applicants. As discussed shortly, this may be most readily done through new system strength related performance standards.
- Finally, if system strength impacts are found for a new connecting party, they become the party solely responsible for remediating the impacts. Determining precisely what such remedial arrangements should be is complex and often adds significant further delay to projects. It is also costly - with remedial works in some cases having cost up to $30 million for individual developers. The process for coordinating system strength remediation efforts for generators should be improved. We note the AEMC's recently introduced "Transparency of new projects" rule change should assist parties in coordinating their needs with other generators in a way that has not been possible to date.

An important issue that we would add to the above list is the manner in which the system strength assessment process interacts with generator performance standards. This aspect of how the system framework assessment process has operated in practice has created risks for renewable generators.

Specifically, AEMO has the discretion under the NER to reopen access terms previously agreed under the 5.3.4A process, if it believes a generator can no longer meet its performance standards. This may occur if the level of system strength in the local network area surrounding a new connection declines after the 5.2.4A process has concluded (or such a future decline becomes evident in system strength modelling). AEMO may then demand or require one or more of the following, until such time it is satisfied the generator can meet its performance standards:

- additional PSCAD modelling iterations;
- technical changes to control or inverter settings; and
- the implementation of system strength remedial measures.

It appears that AEMO has the discretion to reassess previously agreed performance standards at any time during and indeed after the connection process has concluded, as the 5 curtailed generators in the West Murray region can attest. This interaction between changing system strength levels and ongoing compliance with performance standards can cause significant delays, unpredictability and cost for renewable developers in the connection process.

Of particular concern is that once an applicant's connection moves beyond the negotiation framework of 5.3.4A into the registration and commissioning phases, there is no longer a prescriptive process for renegotiating grid access terms. Rather, AEMO can hold up a generator connection indefinitely until it satisfies itself that the connecting party can meet its performance standards.

In principle this level of discretion for AEMO is appropriate, as system security must always be its priority. Nonetheless, given the uncertainty and financial risks this creates for renewable developers, an ongoing ability for AEMO to reopen performance standards is inappropriate. EGP considers changes to existing system strength frameworks should be assessed for their ability to address this key source of connection risk.

AEMC's System Strength Models,

The AEMC has presented four new System Strength Frameworks models for consultation. Each have their strengths and weaknesses.

By removing the do no harm framework and centralising system strength into the planning and investment frameworks, Model 1 could over time ensure networks are stronger prior to new generators connecting.

A key weakness with this Model is that it would not be consistent with cost causation principles. We consider it is important that connecting generators retain an incentive to minimise the costs of how and where they connect. Part of this cost is the impact their connection can have on the strength of the surrounding network, which determines the capability of existing generators to meet their performance standards. Much like the AEMC's proposed COGATI framework seeks to more efficiently price network congestion, an efficient framework for managing system strength should incorporate price signals that encourage connecting generators to reduce or manage the costs they impose on others.

In this regard, we consider the "cost causation" principle on which the do no harm framework is based is important to retain. This principle is important, because it is those who cause costs to be incurred who are in the best position to minimise those costs, leading to more efficient outcomes overall.

Another important implication of Model 1 is that there is a separation between the party making the expenditure decisions, the Network Services Provider (NSP), and the party bearing the costs of those decisions, the consumer. Consumers have little capacity to minimise or manage the costs of system strength expenditures. In other models, such as Model 3 and 4, there is a direct link between the party undertaking the necessary expenditure and the party that bears the cost of those expenditures, which is likely to lead to more efficient outcomes.

Model 2, which presents a decentralised spot market framework for provision of system strength services is attractive in principle, as it allocated risks and costs to those best able to bear them, while the competitive provision of the service should minimise costs and encourage innovative solutions for system strength provision. Clearly defining and valuing the services to be provided in a system strength market and how to co-optimise provision of these service with energy in the spot market is likely to be complex however, particularly given the localised nature of system strength requirements. EGP welcomes further consideration and development of a possible market for system strength services. We understand the Energy Security Board (ESB) is currently investigating this prospect and we look forward to its findings.

Under Model 3 new entrant non-synchronous generators would be obligated, through their performance standards, to contribute a given level of fault current at their connection points, much like conventional generators do currently. By providing a positive contribution to fault levels at the time of its connection, this model would ensure that each new asynchronous connection applicant would add to system strength, rather than take away from it. However, imposing such an obligation on all new and existing generators would create excessive costs for renewable generators and introduce an unnecessary source of sovereign risk into the NEM.

Model 4 would also be applied by means of a new performance standard. While this performance standard would allow the newly connecting generators to better operate in weaker grids, its key short coming is that it does not provide a positive contribution to existing system strength levels. Model 4 therefore does not address the impact of a newly connecting generator on available fault levels for existing generators nearby, or more generally, the declining system strength levels that will occur over time as conventional synchronous generators retire from the power system.

EGP preferred System Strength Model

Rather than wholesale change to current system strength frameworks, we consider that reforms should be incremental and targeted, focussed on addressing the current level of uncertainty and complexity of existing frameworks, particularly as they interact with the connection process. It is also important that changes to frameworks remain consistent with policy directions in other reform areas, such as COGATI, which have as a core objective the allocation of risks and costs to those best able to manage them.

In this regard, we prefer models such as Model 3 and 4, which are most consistent with the principle of allocating costs efficiently and providing efficient locational investment signals. EGP favours in particular model 3, because it enhances system strength rather than weakens it as new asynchronous generators connect. Model 3 would also drive development of innovative new technologies that can provide fault current, such as grid forming inverters and battery technologies, that over the longer term could reduce the cost and impacts of declining levels of system strength.

While we note the AEMC envisages model 3 is to be implemented as a blanket provision applying to all generators, we consider there may be benefit in a more flexible application, consistent with the current flexibility inherent in the performance standards framework. Specifically, Models 3 and Model 4 could be implemented as automatic performance standards. This would better recognise variations in system strength across the network, allowing for more effective locational signalling. It would also minimise the risk of imposing excessive costs on new entrant generators, particularly where they are locating in stronger parts of the grid.

A key strength of Model 3 is that it is envisaged to be relatively flexible. Generators connecting into low system strength parts of the network could either provide fault current directly, by means of grid forming inverters for example, install equipment such as synchronous condensers to meet their obligation, or contract with a third party provider where this is feasible. A number of parties seeking to connect into an area could also coordinate their requirements through shared investment in equipment if economies of scale or scope are relevant. One party could choose to make the upfront investment and recover the costs from others as they seek access to their services. A framework for such cost sharing already existing under the National Electricity Rules (NER) in Schedule 5.11 (6)). In addition, as noted above, the new obligations for AEMO to provide greater transparency and information on co-locating committed projects, should assist parties in coordinating their needs with other generators.

If Model 3 or Model 4 are implemented as automatic performance standards, it is important that this should confer benefits of a simpler and more expeditious connection process with respect to system strength requirements. Those who choose to connect at the automatic level, as was contemplated when the concept of automatic access standards was first introduced, should not need to undertake a full system strength impact assessment.

While this may occur as a practical consequence of implementing Model 3, we consider it is worth this being made clear in the NER, or in the system strength assessment guidelines. Where generators choose to meet automatic access standards this should guarantee a fast route to connection for the particular performance standard in question.

In summary, we consider the implementation of Model 3 as an automatic performance standard would have a range of potential benefits for ensuring a sufficient level of system strength is maintained in the power system, while simplifying the connection process:

- First, the availability of system strength performance standards would provide a route for connection applicants to achieve a much more simplified an expedited connection process. While generators would still be expected to undertake some modelling, the complexity of the modelling should be much reduced. PSCAD/EMT type modelling for full system impact assessments would unlikely be required for a Model 3 connection. By bringing a given level fault current to a connection point, a connection applicant would add to rather than reduce system strength in the local network. This would reduce the need for modelling the complex interactions of that generator against other co-locating inverter based generators in a low system strength environment.
- Second, for the reasons above, this framework should also help address the current uncertainty created in the connection process by the interactions between system strength levels and performance standards. A connecting generator could rest assured that if it chooses to connect at the automatic performance standard for system strength, that this performance standard would stand regardless of whether local system strength levels decline over the course of the connection process. This would remove a significant source of uncertainty and risk for renewable developers in the connection process.
- Third, the Model 3 performance standard should minimise system cost and encourage technological innovation relative to the other models. Connecting generators would have strong incentives to minimise the costs, or maximise the benefits, of their solutions - as this is directly linked to their profits. This contrasts to Model 1 for instance, where the NSP does not bear the cost of the system strength investments it undertakes. It therefore lacks a express financial incentive to minimise those costs, which could increase costs to consumers over time.

Minimum strength framework and ISP

One important issue Model 3 would not specifically address is the decline in system strength caused by the retirement of synchronous generators. It would not be appropriate to apply Model 3 retrospectively to existing generators in this regard, as among other things as this would introduce sovereign risk into the regulatory framework, which would be unnecessary and counterproductive. Further, while the cost causation principle is clear with respect to new entrant asynchronous generators, there is no clear causer of declining system strength levels due to the exit of existing synchronous generation.

Consequently, EGP considers there is still an important role for the minimum strength framework (for which AEMO and NSPs are accountable) in ensuring a strong future grid, which appropriately, allocates the costs of restoring system strength levels to consumers as a prescribed transmission service.

EGP considers that with more experience this framework will be applied more effectively than it has in the past. We note the clauses describing the framework in 5.20C.1 and 5.20C.2 of the NER are inherently forward looking, they simply have not been applied sufficiently far enough in advance by AEMO to be effective. This unnecessary short term focus is reflected in the "System Strength Requirements Methodology," which has a 5 year planning horizon for the procurement of system strength services.

The minimum system strength framework will become more forward looking now that system strength considerations have been included in Integrated System Plan (ISP). The ISP provides a 20 year forward development plan of transmission needs, updated every two years, and specifically incorporates a longer term view on system strength requirements. The ISP will provide much better guidance than has been available in the past on when the minimum system strength framework should be triggered.

One worthwhile change that could be made to the minimum strength framework is to adjust the planning horizon System Strength Requirements Methodology to better reflect the longer term view of the ISP.

Please feel free to contact Con Van Kemenade, Head of Regulatory Affairs, on 0439399943 to discuss anything we have raised in this submission.

Yours faithfully,

Javier Blanco

Country Manager

Enel Green Power Australia