

13/08/2020

Ms Merryn York
Acting Chair
Australian Energy Market Commission
PO Box A2449
Sydney NSW 1235

Lodged online via: www.aemc.gov.au

Dear Merryn,

Submission to the AEMC's system services rule changes consultation paper

TransGrid is the planner, operator and manager of the high voltage transmission network connecting electricity generators, distributors and major end users in New South Wales and the Australian Capital Territory. TransGrid's network is also interconnected to Queensland and Victoria, and is instrumental to an electricity system that allows for interstate energy trading.

The energy system is evolving at a rapid pace. With the growth in intermittent renewable generation, the increasing unreliability of coal fired generation and its earlier than expected retirement, there are significant critical system strength issues emerging.

As the jurisdictional planner and operator of the NSW network, TransGrid is focused on ensuring that the necessary levels of system strength are in place to deliver electricity to consumers in the least cost manner. It is important to make sure that consumers only pay for the efficient expenditure required to deliver electricity to meet their needs, and not pay for additional services to support generator connections or other purposes.

The current arrangements of 'generator do no harm' do not enable a proactive system wide approach to system strength, with individual generators required to invest in technical areas usually outside their core capability and using a technical solution that addresses only the immediate connection issue. This is resulting in costly, disparate and independent solutions being placed on the network - rather than a holistic and risk based approach.

The jurisdictional planner and operator is best placed to plan, procure and deliver cost effective and secure system strength services in an independent and best for consumer manner due to the:

- > existing jurisdictional planning functions and joint planning relationships which facilitate the ability to co-optimize with the provision of other services (such as thermal capacity and inertia); and
- > oversight by the AER to ensure any expenditure is prudent and efficient through the existing economic regulatory arrangements.

The other proposed system services rule changes submitted for consideration to the AEMC by other organisations suggest market based solutions for the provision of system security and reliability services required in shorter time frames (i.e. 'commitment' or 'dispatch' time-frames). In principle, TransGrid supports valuing these services and their procurement on a technology neutral basis. However, the examination of these market based solutions is closely related to both the Energy Security Board's post-2025 Market Design Project and the Australian Energy Market Operator's Renewable Integration Study Project. TransGrid's view is that these other rule change proposals for

market services should not be progressed by the AEMC until the ESB and AEMO projects are sufficiently progressed, to ensure a holistic market solution.

It is critical that TransGrid's rule change proposal (Efficient management of system strength on the power system) is progressed as a priority. This rule change *can and should be progressed independently* to the other rule change proposals, due to the limited interactions between them. TransGrid's rule change *should be progressed expeditiously* due to the need to urgently address ongoing issues with managing system strength on the power system and the poor outcomes for consumers that result.

TransGrid's detailed response to the consultation paper is provided in the attached submission.

We appreciate the opportunity to make this submission. If you have any queries, please do not hesitate to contact me or the Head of Public Policy, Catriona Webster.

Yours faithfully

Eva Hanly

Executive Manager, Strategy, Innovation & Technology

1. Approach (AEMC Questions 1 - 4)

The AEMC has commenced consultation on six rule change proposals relating to system security and reliability services, including TransGrid's proposed approach to addressing system strength issues. The consultation relates to energy resource adequacy at the time of dispatch, as well as the provision of system security services such as system strength, inertia, fast frequency response, primary frequency response, ramping capability and voltage control.

These system services are currently provided as a by-product of synchronous (mainly thermal) generation. They are not currently valued separately in the National Energy Market (NEM). In order to manage the power system transition it is essential that these critical system services are valued independently from bulk energy so that efficient decisions can be made to meet consumer needs for secure, reliable and affordable electricity.

1.1 Interactions with other work

TransGrid's rule change proposal on system strength should be progressed as a matter of urgency, while the other rule change proposals should be progressed once relevant projects of other market bodies are more advanced.

Most of the rule change proposals that this consultation responds to suggest market based approaches to value and dispatch resources to ensure sufficient system services to provide security and reliability. These rule change proposals are closely related with each other and the work programs of the Energy Security Board (ESB) and Australian Energy Market Operator (AEMO). They should not be progressed independently and in advance of the ESB and AEMO processes. The ESB and AEMO processes should provide valuable technical and theoretical market design inputs before the AEMC can assess these market based approaches holistically and in a way that does not require significant redesign in the near term.

Conversely, the TransGrid rule change proposal can be progressed independently of the others as a discreet and more pressing issue. First, a new approach is required as a matter of urgency in order to limit legacy issues from the proliferation of generator owned equipment providing system strength remediation on the power system. Secondly, the overall approach to the provision of bulk system strength to meet essential levels on a proactive basis is appropriately provided as a regulated network service in the 'investment' timeframe. Accordingly this can be progressed separately from the other processes seeking to address the provision of services through market based approaches that operate in the 'commitment' and 'dispatch' timeframes.

TransGrid agrees with the proposed approach of further developing timelines for the rule changes once stakeholder input on this issue has been considered.

1.2 Conceptual categorisation of rule changes and approaches

The proposal to group the rule changes into different timeframes and services appears to be appropriate, allowing a structured approach to considering the issues that arise for the provision of each service. Most of the relevant issues appear to be captured in Figure 3.1 of the AEMC's consultation paper. When considering the rule change proposals relating to fast frequency response and a capacity commitment mechanism the AEMC should consider how these types of services and markets would interact with the jurisdictional planner's procurement (in investment timeframes) of inertia to fill any identified shortfalls.

Services that are more appropriately procured in the 'investment' timeframe are those that are not easily commodified, are limited in effect by location, or would clearly benefit from forward planning or scale efficiency. The clearest example of this is system strength. Another service that can exhibit some of these characteristics is inertia. In some cases the provision of inertia, particularly to meet projected shortfalls, could

benefit from forward planning and scale efficient solutions, as well as potentially benefiting from procurement that is co-ordinated with the procurement of system strength services.

Services that are more appropriately procured in the 'commitment' or 'dispatch' timeframe are those that are able to be commodified, are not limited in their effect by location, and for which there is no clear benefit from forward planning and scale efficiency in procurement. These include most services related to energy and frequency, with the exception of providing minimum levels of inertia where a shortfall is projected.

1.3 Assessment framework

The AEMC has proposed a system services objective as a guide to the approach it will take to assessing the rule change proposals. We note the National Electricity Objective (NEO) remains the ultimate test against which any changes must be measured. However, the proposed system services objective appears to be an appropriate framing of the NEO for the purposes of the proposed rule changes that are the subject of this consultation.

The starting point for considering the approach to delivering each service should be to define the security and reliability needs of the overall power system. From this, each component service should be clearly defined to meet the overall system need. Once the mix of services have been settled and defined, the proposed service design framework (the '4 Ps') appears to be an appropriate approach to forming a high-level design for the provision of each service.

The proposed principles for assessment are generally appropriate for the consideration of these rule changes. TransGrid would emphasise that transparency and governance of approaches to procure services is critical to ongoing consumer confidence in the system.

Different principles will be more or less relevant to different aspects of the frameworks to provide system services. A practical worked example of this is to consider the principle of technology neutrality. Technology neutrality will be particularly important to consider at the point of defining services and less important for some other aspects of framework design (such as pricing). Critical choices regarding defining a service should be based on a technology neutral view of the overall system needs. For example:

- > a system need is to balance supply and demand in real time, given uncertainty at the time of dispatch that results from a transitioning generation fleet
- > a range of system services could be defined to meet that need, however the services could be defined in a way that:
 - allows all technologies to compete on a level playing field to meet that need, OR
 - favours the technical or commercial characteristics of some technologies over others to meet the need, for no clearly justifiable reason.

To make this example more relevant to the rule changes before the AEMC, a 30-minute ramping service is likely to favour particular technologies over others in meeting the power system needs, for no clearly justifiable reason.

An alternative may be to consider or enhance the market's impending shift to 5-minute financial settlement. This would provide a more transparent price signal for the task of balancing supply and demand in each dispatch interval. This should send clear signals to invest in equipment that is suited to the role of balancing supply and demand around the other equipment on the power system (which will evolve throughout the transition). Based on current technologies this may involve investors deciding between technologies that can ramp slowly over extended periods and technologies that can turn on and ramp very quickly for shorter periods. This technology trade-off may not necessarily be present in the future as technologies evolve. The important point however is that the framework should place investors in the position to make considered and appropriate decisions on (and therefore face risks relating to) the value of technologies in meeting supply and demand in each dispatch interval. The framework itself should not make that decision for investors, and there is a risk of this occurring if the framework pre-determines that the best way for supply to meet demand is to use technologies capable of sustained ramping over a 30 minute period.

2. System strength (AEMC Questions 11 – 13)

The sections below respond to:

- > the AEMC’s consultations on:
 - Hydro Tasmania’s proposed synchronous services market,
 - TransGrid’s proposed approach to providing essential levels of system strength, and
- > the AEMC’s further consultation questions relating to the frameworks to support the provision of system strength on the power system.

2.1 Synchronous services markets rule change

As noted above, system strength should be principally procured in the investment timeframe. This is because the service is not easily commodified, is limited in effect by location, and would clearly benefit from forward planning and scale efficiency. The clear benefits from forward planning and scale efficiency are set out in TransGrid’s rule change proposal and shown in the ARENA funded study, “Managing system strength during the transition to renewables”.¹ Voltage control is a similarly locational issue, however existing frameworks may be sufficient because this service is not under significant threat as synchronous machines retire.

TransGrid does not consider Hydro Tasmania’s rule change proposal presents a viable model to provide for investment to maintain essential levels of system strength or voltage control to keep the power system secure. First, it would not lead to optimal outcomes in terms of the timing and location of new system strength services. It would also not enable the coordination of the service with other related services. Further, it would be unlikely to send clear price signals to promote efficient investment, particularly in the absence of a liquid contracts market that could underwrite decisions to invest in the capability to provide system strength services.

While efficient outcomes are likely to flow from valuing the provision of existing system strength services and services above the minimum secure level, Hydro Tasmania’s rule change proposal is not the most appropriate option to achieve this. It is likely that, given the physical properties of system strength, these services are better procured through alternative options. TransGrid suggests a range of approaches to value existing and additional levels of system strength should be considered in alignment with the ESB’s post-2025 work program.

Further comments on complementary system strength measures are provided in Section 2.3 below.

2.2 Efficient management of system strength on the power system

The TransGrid proposal addresses the majority of the issues related to system strength. It does not however directly address issues relating to the optimal dispatch and use of existing generator resources, or the optimal approach to providing system strength above essential levels. Some changes to TransGrid’s proposal and new complementary arrangements are likely to be required to refine the approach in order to address the totality of the issues relating to system strength on the power system.

A system strength planning standard

TransGrid considers that a system strength planning standard met by TNSPs would most effectively and proactively deliver essential levels of system strength on a proactive basis. There are however a number of ways a planning standard could be defined. The different approaches would likely vary in key respects, including:

- > the ability to forecast and therefore proactively address emerging issues, and
- > the way identified needs for the power system are formed, which would have implications for the approach to development of options to meet the needs, testing of non-network options and approval of efficient expenditure.

¹ See: <https://arena.gov.au/assets/2020/05/managing-system-strength-during-the-transition-to-renewables.pdf>

The settings for these variables would each impact outcomes for consumers, particularly concerning the balance between the risks of early or over-investment vs. late or under-investment. The approach taken should be subject to public consultation to ensure all stakeholders have the ability to provide their views on the trade-offs involved.

TransGrid considers a system strength planning standard that strikes an appropriate balance would be:

- > transparently set by an independent party with the task of weighing the costs of over- vs. under-investment in the service
- > clear and capable of being translated into forecasts of power system needs, and
- > simple and quick to use as the basis for objectively assessing options to deliver the system needs and seeking the approval of efficient expenditure to meet those needs.

Locational signals for new generation

It is important that the overall approach to addressing system strength on the power system sends appropriate signals to generators regarding where to locate. The current approach, which places responsibility on generators to contestably procure system strength services to remediate their impact on the power system, is not sending clear locational signals and is not resulting in efficient outcomes. Generators are not well placed to manage the risks associated with system strength on the power system, with their locational decisions impacted by lack of information and also only being a small part of the overall picture. Ensuring locational signals for generators are proportionate and transparent should be an important aspect of the system strength framework.

TransGrid's rule change proposal seeks to align development of thermal transmission capacity, and the transition of the generation mix, with the procurement of system strength services to essential levels. This is to be achieved using AEMO's Integrated System Plan (ISP) as a starting point, and defining the requirements to procure system strength services linked to specific nodes. This should provide a clear locational signal to new generation regarding where in the power system they can expect system strength to be maintained. If the generator chooses to locate remotely from a system strength node, they should provide sufficient system strength to support their own connection. Enabling this concept may require changes to access arrangements (or the incorporation of a new mechanism) to incentivise the minimisation of a new connecting generator's impact on the local network and proximate plant in those circumstances. A further approach to minimising a generator's impact on the network could be the inclusion of an access standard that requires a connecting generator to be capable of stable operation at low levels of short circuit ratio.

Who should pay for system strength services

A related issue to that of locational signals is whether requiring generators to pay for the procurement of system strength services would send signals to generators about where to locate on the network and the technical performance of the equipment they connect. While this is attractive in theory, and should be carefully considered in the future, it is not feasible to design a complex generator use of system charge in the timeframe required to deliver this urgent reform.

The TransGrid proposal is principally concerned with the proactive delivery of essential levels of system strength necessary to deliver electricity to consumers. For this reason it is important to make sure that consumers only pay for the efficient expenditure required to deliver electricity to meet their needs, and not pay for additional services to support generator connections or other purposes. This is analogous to the provision of other network services to meet consumer needs, such as thermal transmission capacity.

TransGrid considers that these objectives are met in its proposal. As the generation mix and transmission system transition, the ISP should be used as a guiding tool to inform the optimal development of the system to meet consumer needs. This includes thermal capacity, system strength and other system service needs. The appropriate party to undertake more detailed planning and procurement for the provision of essential levels of system strength is the jurisdictional planner. This is because:

- > *With respect to planning*, the jurisdictional planner is best able to co-optimize procurement of system strength with other network services. The jurisdictional planner is also in a better position to respond quickly when the real world departs from the ISP scenarios. The jurisdictional planner's joint planning and engagement with other jurisdictional planning bodies, DNSPs and connecting generators in their regions allows greater visibility of emerging system strength issues.

- > *With respect to procurement*, there are existing tools to discipline procurement decisions for regulated services in the planning and investment frameworks as well as in the economic regulatory framework. These tools aren't present or indeed replicable to discipline other centralised approaches to procurement. In our proposed rule change we also seek to strengthen that discipline. First, by using the ISP as the starting point for modelling how much of the service is required (to avoid misalignment between procurement of system strength services and development of thermal capacity and other services). Secondly, by having the Reliability Panel set the target for performance in a way that balances the costs of over-and under-investment.

2.3 Complementary measures for system strength

TransGrid considers the approach it proposes in its rule change request is the appropriate way to proactively deliver essential levels of system strength required for secure operation. The jurisdictional planner should have the obligation to provide essential levels of system strength, and also be able to provide system strength services where there are net market benefits. For example, where the level of system strength in a region is above the essential level required for system security, but nonetheless forms a constraint or expected constraint on the network, it should be open to jurisdictional planners to address a need to alleviate that constraint if that is shown to have net market benefits under a RIT-T process.

There are likely benefits to clarifying the mechanisms to separately value the system strength already provided, and to provide levels of system strength above the essential levels. Separately valuing existing sources of system strength could lead to more efficient overall outcomes as the total value of generation that also provides system strength becomes transparent. Arrangements for the provision of system strength above essential levels could provide for a more efficient use of the network or dispatch of the market, where there are net market benefits.

TransGrid supports the AEMC considering all options for the valuing of existing sources of system strength and for the provision of system strength above essential levels. In assessing the options the AEMC should be taken into account the need to build upon and be consistent with the approach to providing essential levels of the service. Market based or hybrid solutions should be considered in alignment with the ESB's post-2025 work program.