



Response to Proposed Generator Technical Performance Standards Rule Changes

The Australian Energy Market Operator (AEMO) has requested to make changes to Schedule 5.2 of the National Electricity Rules (NER) in relation to the performance of new generators negotiating their connection. As a result, the Australian Energy Market Commission (AEMC) has undertaken a consultation process and released a paper outlining its recommendations. The goal of this submission is to address the key recommendations put forward by AEMC on the rules proposed by AEMO.

First Solar is fully supportive of the Federal Government's backing of renewable energy development to-date and acknowledges the need to update and clarify the existing NER in order to guarantee the reliability of the National Energy Market (NEM) for the long-term. However, it is imperative these rule changes focus on appeasing the current constraints and removing uncertainty while ensuring that market participants have sufficient transparency and forward visibility to enable ongoing investment in new renewable energy generation.

Transitional arrangement

The proposed retroactive transitional arrangements are contrary to the process set out in the NER and ignore the significant commercial impacts of changing requirements for advanced-stage projects. Generator finance is negotiated around the specific yield expectations that are based on the design agreed to in the Generator Performance Standards. Retroactive changes to Generator Performance Standards can have significant implications for yield, capital expenditure, planning approvals and project timelines, undermining agreed finance terms. Implementing the rules from date of submission will significantly undermine investment confidence in new generation projects which are needed to reduce electricity prices. It would also set an untenable precedent going forward that new generators must design their projects to comply with all future rule change proposals prior to final determination, which would result in inefficient, costly, and in some cases unnecessary project design modifications counter to the National Electricity Objective.

For this very reason, it should be self-evident that the transitional arrangements as described in the AEMC rule change process are intended to apply post-final determination of the rule change request and should be designed to mitigate impacts on advanced-stage projects in order to avoid undermining investment confidence in new generation. The proposed transitional arrangements do the exact opposite and therefore should be rejected.

Furthermore, the process undertaken to implement the rule changes has been expedited against the process set out in the NER. This is evidenced by AEMO requesting compliance with the new rules – and therefore influencing market behavior – ahead of implementation despite AEMC clearly stating that it cannot apply rules retroactively. The rule changes should not apply to projects that have submitted a complete application for grid connection. Once a final determination on the rules is made, a grace period



should be implemented to provide adequate time for developers to transition and for the associated costs to be built into project financial models.

It is also imperative that the language around the transitional arrangements is precise concerning when the new rules would apply. The current proposed transitional arrangements are ambiguous around the definition of 'finalised' and it is not clear whether this means when registered with AEMO (upon commissioning), or agreed to by AEMO in the form of a 5.2.4A letter which is needed to start construction. This is already causing confusion in the market, increasing the risk of investor abandonment of projects.

Frequency response capability

While a frequency response capability is something that inverter technology is able to achieve from a control system point of view, the proposed change to the Minimum Performance Standard requiring generators to provide an increase in active power in response to under-frequency, is fundamentally at odds with variable generation where the maximum amount of power is continuously being exported in accordance with solar or wind resource availability. It is also at odds with the market-based approach which has historically been favoured to procure frequency security services cost-effectively. Increasing active power in response to frequency disturbances is only possible either with the use of batteries or a constant de-rate being applied to the solar or wind generator output, both of which add significant costs to projects and may make some investments unviable depending on the magnitude and duration of response that is required.

Forcing new renewable generators to have the capability to provide a positive under-frequency response will not only result in inefficient investment outcomes where the response could be procured more cost-effectively through a free market but it could also undermine existing investments by interfering with the market-based supply-demand balance in the Frequency Control Ancillary Services (FCAS) market.

Exacerbating the above concerns is the lack of clarity around how much active power variable generators will need to be able to supply in response to frequency disturbances. Apart from the highly ambiguous 'measurable amount' of market ancillary service described in the minimum performance standard, the general requirement allows for a droop of up to 10 per cent, but the only defined cap on the required response is up to the generator's maximum operating level. The current language fails to take into account that variable generators spend much of their time operating far below their maximum operating level, and could imply that a solar farm must have the capability to supply its full rated output at any time in response to a frequency disturbance of 10 per cent or less. There is no way for a variable generator to achieve this without a dispatchable battery sized to the full rated output of the generator. Therefore, the proposed rule would lead to a significant overinvestment in battery storage when the required dispatchable power could have been easily procured at a much lower cost through an existing open market.

Whether or not this would lead to increased participation in the FCAS market is unclear, since although all new generators would be likely to participate as they try to recover the cost of complying with the new requirement, the rule would also kill off significant amounts of investment that otherwise would have occurred. However, it is very clear that such requirements would increase the cost of electricity and make it more difficult for Australia to reach its emissions reductions targets by significantly and unnecessarily increasing the cost of renewable energy.



First Solar has the following recommendations for the proposed rule change:

1. The changes to the minimum access standard c) ii) for all generators 30 megawatts or more to provide an increase in active power in response to a decrease in power system frequency should be rejected. Instead:
 - a. The minimum access standard should require generators to include the control system capability – which First Solar notes can be delivered at minimal cost – but should not require generators to have the physical capability (from battery storage or similar) to deliver an increase in power system transfer in response to a decrease in power system frequency. This will future-proof the network and ensure the capability exists to utilise lower-cost storage technologies as prices decrease, rather than mandating an unnecessary amount of storage that would make many projects unviable, and lead to inefficient investment outcomes.
 - b. Rather than forcing all new generators to participate in FCAS via regulation, incentives and rules in the FCAS market should be aligned to attract new participants and deliver the desired capability in a more centralised cost-efficient manner.
2. In the event that an under-frequency response is accepted as a minimum requirement against our primary recommendation (which as we have explained amounts to mandated storage for variable generators), the minimum amount required for semi-scheduled generators must be clearly defined in terms of both duration and percentage of the generator’s maximum operating level such that the amount of storage required to be installed delivers the improved reliability and security outcomes at a reasonable cost, and does not result in gold-plated dispatchable capability that will rarely be used. It is essential for developers to have visibility on the amount of storage that will be necessary so that they can build an economic case for their projects, and for the amount to be determined based on consultation with industry participants and sound engineering analysis.

Voltage control and reactive power requirements

While the proposed changes are achievable for solar farm control systems, there will be significant cost impact disparity across generators depending on generator size and the strength of the system in which they are operating, calling into question the efficiency of the proposed requirements. The requirements will come at a high cost to some generators, especially those that are located in strong network locations or for generators of relatively small size, where correspondingly large amounts of reactive power are required to control the network voltage in accordance with the proposed accuracy requirements. The changes will, therefore, create new cost barriers for entry by smaller generators and lead to inefficient investment outcomes by requiring generators to provide the largest amount of reactive support in locations where it is least needed.

First Solar recommends that the requirement for voltage control capability should be limited based on the amount of reactive capability that generators need to provide under the automatic access standard for S5.2.5.1. Alternatively, the control accuracy requirements should only apply during contingencies when the



network is weakened, which would reduce the amount of reactive power required while delivering the same network security outcomes.

Definition of continuous uninterrupted operation

While it's important to note that the proposed requirement for continuous uninterrupted operation is significantly more onerous than similar requirements in international markets, and that many existing synchronous generators are not capable of complying with it, we nevertheless acknowledge that new solar power plants can comply with this requirement by purchasing additional inverter capacity which is essentially kept in reserve at all times. First Solar recommends a review of the goals behind the new definition to determine whether the desired security outcomes could be achieved more cost-effectively through a mechanism that spreads the cost across all market participants. This would avoid placing the majority of the burden on new generators which acts as yet another impediment to investment in new generation.

Of more concern is the fact that the revised definition of continuous uninterrupted operation has already been enforced by AEMO on multiple projects without prior industry consultation. This undermines investor confidence, as developers and lenders are rightly concerned that future projects could be jeopardised without notice of further new technical requirements that erode the assumptions underpinning their project financing.

Conclusion

We acknowledge the need for AEMO to prioritise the reliability and security of the NEM and appreciate there is a degree of urgency in updating performance standards to align with the changing technology landscape. However, it is also imperative that market participants have sufficient transparency and forward visibility to enable ongoing investment in new renewable energy generation in order to simultaneously deliver more affordable electricity to Australian consumers while providing critical progress on our emissions reduction targets. For that reason, retroactive changes should not be entertained and generators need grace periods to comply with new requirements in order to maintain investor confidence.

While the majority of the proposed rule changes are underpinned by valid security or reliability concerns, many of the proposed changes to the Generator Performance Standards will result in unintended consequences, unnecessarily increasing the cost of electricity through an inefficient allocation of capabilities. This will lead to investor uncertainty resulting in reduced investment and competition in the NEM, and in some cases even fail to deliver the desired security or reliability outcome despite these negative side-effects.

First Solar strongly recommends that additional time is taken to consult the industry further on the proposed changes and that a more structured and collaborative approach is taken to design performance standards and market rules that deliver on the National Electricity Objective. Renewable energy is a critical part of our power system and despite the significant pipeline of projects in Australia, these rule changes have the potential to significantly impact market growth. In this context, it is critical that the views of the industry are considered to support stable renewable energy deployment and development for the long-term.