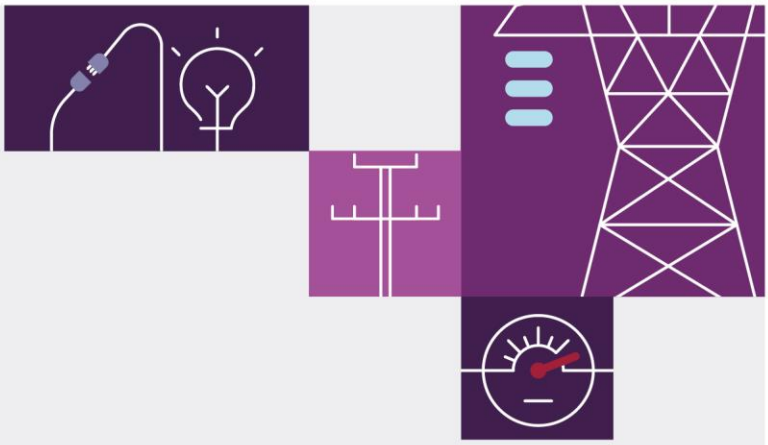
AEMO review of technical requirements for connection final report: Appendix 5

22 December 2023

Stakeholder consultation analysis and revised recommendations – NER Schedule 5.3



Important notice

Purpose

This is Appendix 5 to the Final Report published as part of AEMO's periodic review of the technical requirements for connection in the National Electricity Market under clause 5.2.6A of the National Electricity Rules.

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1 Draft report addendum submissions

AEMO received the following submissions on its draft report addendum:

1. AusNet
2. Brickworks
3. AGL
4. Energy Queensland
5. Transgrid
6. EUAA
7. ElectraNet
8. TasNetworks
9. Tesla
10. Amp Power
11. Powerlink Queensland.

2 General feedback

Issue	Schedule 5.3 Load Recommendation feedback summary – General feedback	AEMO response
NSP should be solely responsible for load connections	**Brickworks** • Does not support AEMO's recommendation to impose additional technical obligations on end users that have a Single Facility Load (>5MW) or a Large Single Facility IBL (>30 MW). The relevant electricity network manages end user connections, and it's appropriate that networks remain wholly responsible for new connections, modifications to existing connections, and requests for disconnections. • AEMO has not demonstrated the need to impose further technical connection requirements on end users and has failed to quantify the additional cost and time delay to end users if the recommendations were adopted. **ElectraNet** • Views the NEM as having varied and complex localised networks best suited and understood by the local Network Service Provider (NSP). **Powerlink** • As the required performance is subject to the location and size of the load, the NSP is in the best position to negotiate the required performance so that a new load connection does not prevent the NSP meeting the required system standards. • Distribution and Transmission NSPs should agree on the required performance of a new load via joint planning if connection of a new load has potential to impact the Distribution or Transmission NSP meeting the system standards.	AEMO agrees with Brickworks that the NSP is the primary entity responsible for load connections. However, in the future the performance of some larger loads could impact the security of the power system unless the ride through performance of the power system is considered. AEMO also agrees with ElectraNet and Powerlink that the system security issues caused by large loads can be complex and best considered by the local NSP. Connecting NSPs will remain responsible for the negotiation of performance standards, consistent with the NER structure. However, AEMO also has primary responsibility under the NER for managing system security and it is therefore appropriate for AEMO to have an advisory role in the connection process for loads whose connection and operation has the potential to adversely impact system security. Of particular interest would be the ride through capability of the loads. AEMO proposes that when detailed access standards are developed for load ride-through requirements, these should be designated as AEMO advisory matters. Any size threshold applied would be made consistent across schedules 5.2 and 5.3.
Requirement to perform system strength assessments	**EUAA** • Stated concern that all consumers that meet the proposed new load definitions will be required to perform system strength impact assessments (modelling), requiring engagement of Power Systems Engineers. Our understanding is that many traditional industrial loads will be captured by the proposed new load definitions and be required to undertake modelling. • The EUAA believes that the 5MW threshold for a facility to be required to have Minimum Access Standards and system strength impact assessments is too low. Requiring such small loads to perform system strength impact assessments is unnecessarily onerous for the impacted consumer, the NSP and AEMO. EUAA members agree that the 5MW threshold is far too low.	AEMO notes EUAA's concern. However, the requirement to perform system strength assessment (applicable to large inverter based resources) is an existing requirement in the NER which commenced in March 2023. It is not directly related to this Review. More information on these requirements is available in the System Strength Impact Assessment Guidelines on the AEMO website. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report.

Issue	Schedule 5.3 Load Recommendation feedback summary – General feedback	AEMO response
Recommendations should better target future risks identified by AEMO	**EUAA** • It is the EUAA's view that a targeted rule change aimed at the particular risks identified by AEMO in relation to IBL is a better option than a rule change that captures many industrial loads which have proven over time to be of no issue. • While the EUAA supports the non-retrospective nature of the proposed rule change, EUAA recommends that AEMO needs to define when changes to existing loads would be captured by the proposed rule change. For example, would a change in network capacity/connection agreement with the NSP trigger the proposed rule, or would a change in equipment type behind the meter (with no change to connection agreement or load requirements from the network) trigger the proposed rule? EUAA's view is that the proposed rule should only apply when there is a "material" change to the operations of the load, for example, a complete change in industry or type, order of magnitude change in scale, or change which would require a new connection agreement with the NSP. Minor, or even moderate changes, to a load should not trigger the proposed rule. Similarly, if a site is significantly expanding requiring a new supply point and connection agreement, the existing plant should remain exempt from the proposed rule change.	Following submissions on the addendum, AEMO is reviewing the thresholds and other criteria for which loads would be required to consider the additional access standards. AEMO agrees that alterations to existing plant should only be considered if the alteration represents a material change impacting power system operation, and has made recommendations for appropriate thresholds specifically for alterations. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report.
Modelling requirements to be performed by the NSP rather than the customer	**EUAA** • In circumstances where modelling is required as part of the proposed rule change, the EUAA does not support the notion that this modelling should be completed by the customer. In the vast majority of cases load customers do not have expertise in electricity networks and system designs, and NSPs are far better suited to carry out this modelling work on an as needs basis.	Given that the connecting party will be the person with the relationship with the OEMs that provides the equipment and models, AEMO does not currently consider there is a suitable alternative party to assume responsibility for modelling of the customer's equipment, in a similar manner to a connecting generator.
Use of Australian Standards to determine the performance of load equipment	**EUAA** • The EUAA considers that a better approach is to develop or modify Australian Standards for loads of concern. To draw parallels, AS/NZS 5033:2021, Installation and safety requirements for photovoltaic (PV) arrays and AS/NZS 4777.2:2020 Inverter Requirements have worked efficiently for roof-top solar on households and small commercial facilities and have been updated as issues have arisen, including safety concerns, minimum standards for inverters and standard settings for each jurisdiction. • Existing standard AS/NZ 61800 covers "Adjustable speed electrical power drive systems" includes requirements for voltage and frequency immunity. If this standard is not adequate, AEMO should consider having the standard revised. • AEMO should also consider if a satisfactory outcome can be achieved via modifications to existing standards such as AS/NZ 62040 for "Uninterruptible power systems" and AS/NZ 22734 "Hydrogen generators using water electrolysis — Industrial, commercial, and residential applications", which seem directly related to AEMO's major concern. • An added benefit of using Australian Standards as a mechanism for change is that they can also be adopted for smaller installations, avoiding the need to set a threshold while also ensuring that existing equipment is not subject to retrospective changes.	Although reliance on standards could work in some circumstances, AEMO considers the disadvantages of this approach include: • The process for changing standards is time consuming and is likely to take as long or longer than the AEMC rule change process. • The resulting standards may not necessarily be consistent with the NEO or align well with the system standards in Schedule 5.1a and the access standards for other plant in Schedules 5.2 and 5.3a. • A comprehensive application of ride through capability through the Australia Standards would involve many individual standards.
Parties best placed to manage system security risks	**EUAA** • EUAA and its members point out that, while there exists a requirement in the NEM for all participants to ensure system security, industrial participants are not well placed to manage the system security. Generators, NSPs and AEMO are far better placed to manage system security as they have the necessary	Where size and impact thresholds are met, AEMO considers that it is appropriate for large single facility loads to understand and manage their own impact going forward, particularly given the expected size and range

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	expertise and the knowledge and experience of the local network, broader network and entire network functionality and operations that the industrial participants are not reasonably expected to understand. • Likewise, it is unrealistic to expect industrial participants to develop electrical models of their sites' interaction with the existing grid for connection. The existing process for consumers is that NSPs collect data on equipment and likely utilisation as part of a connection application process and carry out the necessary network modelling as appropriate. This is then billed back to the applicant as part of the connection cost. This is an efficient approach as the NSP has a fixed price and knows the particular nuances of their network, allowing them to automatically include these in the model. • If the consumer is required to have the modelling performed (as generators currently do), EUAA can see inefficiencies and unknown extra costs mounting for the consumer. The EUAA is aware that this already occurs with generators (who have a much better grasp on Power Systems Engineering) with a third-party model being managed by the generator, and with frequent checks by the NSP and corrections required to match the particular network nuances. This process often requires up to 8-10 iterations before the model is acceptable to the NSP, whereas the models built by the NSP usually require 2-3 iterations. With consumers managing a third-party to develop a model, it is likely to take more iterations than the generators take as it is unrealistic to expect consumers to employ a full-time connections expert to manage the process. • EUAA members agree that meeting AAS and MAS requirements will increase costs due to limited equipment suppliers and limited Power Systems Engineers capable of performing the modelling. EUAA and its members agree that the inclusion of all traditional large loads in the proposed rule change will result in the consumers delaying or foregoing future investment due to unknown cost and time requirements of meeting the standards. • AEMO's argument that the costs will be offset through fewer disturbances does not appear credible and was not supported through an evidence-based approach, but rather a theoretically hypothetical approach. AEMO also did not provide estimates of the savings, nor the costs of meeting the AAS or MAS.	of technologies expected to be employed in some facilities. As discussed in final report section 4.2, rather than the NSP and AEMO seeking to manage these impacts, it is likely to be more efficient to impose ride through requirements on a small number of large single facility loads. For these reasons AEMO would recommend that large single facility loads negotiate ride through access standards with the NSP, subject to AEMO advice. The negotiated performance standards will need to balance the needs of the power system and capability of the plant to meet the agreed ride through performance.
External factors requiring large loads to upgrade their plant	**EUAA** • With many of EUAA's members requiring updates to their sites through the Commonwealth Government's Safeguard Mechanism, the EUAA would be very concerned if AEMO's proposed rule change impacted the viability of those upgrades by triggering AAS or MAS requirements on the existing sites, potentially leading to those companies withdrawing from those sites and/or Australia.	AEMO agrees that reasonable limits should apply to replacement or expansion plant at existing load facilities. AEMO recommends: • Apply the size threshold for application of technical requirements to the incremental change proposed for replacement or expansion plant at existing load facilities, not the total size of the whole facility. • Apply a lower threshold to an augmentation where: – the total size of the plant including the augmentation exceeds the threshold; and – AEMO or the NSP consider that without application of additional performance requirements, the performance of the combined facility could adversely impact power system security or quality of supply to other network users. This is discussed in section 4.4.2 of the report.

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Ramp rate limits for loads	**TasNetworks** • TasNetworks is concerned with AEMO's decision to take no action on limiting active power ramp rate for loads. TasNetworks has received a number of new load related enquiries that would result in a considerable increase in overall load in the region both individually and certainly in aggregate. • It is conceivable that these loads will be price sensitive. Indeed, some proponents have stated to us as part of their connection enquiry process, that they will operate according to algorithms that use the market price of energy, frequency control ancillary services (FCAS) and where relevant commodity prices. The outcome of the algorithms is that the load will 'disconnect' and 'reconnect' with potentially no or very limited warning. If the algorithm is particularly sensitive to the energy price then it is feasible to see oscillations in load – a price rise triggering load to decrease, resulting in a drop in energy price, resulting in the load reconnecting, returning to the original market conditions and the cycle repeating. This could be detrimental to other market participants, both due to the price volatility and potential damage to generation plant as it ramps up and down repeatedly to meet demand. • TasNetworks notes this issue was previously raised in 2017 in the Non-scheduled generation and load in central dispatch rule change (ERC 203). At that time, the Australian Energy Market Commission (AEMC) decided against making a rule change, citing AEMO's power under 3.8.2(e) of the NER to require participants (both generators and loads) to participate in central dispatch to the extent necessary to ensure system security. The AEMC did note that the "technological change that is occurring is likely to result in increased amounts of small generation and more responsive loads" and that "the requirements to participate in central dispatch may also need to change". • TasNetworks is concerned that relying solely on AEMO exercising its power under 3.8.2(e) of the NER to manage system security may be insufficient. There may be initial reticence with using these powers and it may only be after the first incident – potentially a system black - that there will be sufficient 'evidence' that the use of these powers is required.	AEMO considers that these issues are best managed through other processes, rather than in the access standards. This is discussed in Appendix A1.1 of the Addendum to the draft report.
Loads should have flexibility to procure services to meet NSP ride through requirements	**Powerlink** • If required by the connecting NSP, loads should have flexibility to procure a service to remediate any material adverse impact on the network performance caused by the new load connection (e.g. trip of the load under disturbance) if the required dynamic performance cannot be achieved by the technology type chosen for the load.	AEMO agrees provided that there is agreement with the NSP and (where relevant) AEMO.

3 Feedback on policy issues

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
NER S5.3.1 – Policy issues		
Recognition of different load technologies	**AGL – partial support** • AGL somewhat supports Option 2, to consider IBL requirements and general requirements for load separately, as we can appreciate that this may lead to better outcomes for the power system. However, some IBLs are quite small, and it may not always be appropriate to impose an additional performance burden on these IBLs. AGL suggests that AEMO consider including a MW size threshold for IBL to align small IBL with the general load requirements. • AGL has typically supported the NER being technology neutral as an overarching principle, however we appreciate that as technologies develop, some flexibility may be required to achieve the best possible outcomes for the NEM and to encourage and incentivise innovation. **AMP – oppose** • Agrees that it is important to recognise different load technologies. However, we are concerned that by setting two sets of requirements with the more onerous one applied to IBL just because they may be able to meet does not appropriately address the impact of a new load connection to the network. For example, the impact of a 500 MW "other" load tripping during voltage disturbances can be much higher than the impact of a 100 MW IBL in the same area tripping during the same voltage disturbances but AEMO's proposal would require a much higher technical performance standards from the IBL than the bigger "other" load. In the other words, the IBL is being penalised for having better controllability. This is similar to the issue which has been identified in Schedule 5.2 for generators, in relation to S5.2.5.1 and S5.2.5.5 (the use of the installed MVA rating for the calculation of the maximum current during faults). • In addition, the definition of IBL is quite broad which means there are likely many different types of IBL with different control/performance characteristics. Until they are well understood, it is not appropriate to set technical requirements based on "perceived" capability. • We also propose that any technical requirements need to be set based on the impact of the load on the network and what we need to do to mitigate the risk. **AusNet – support** • AusNet supports the proposed Option 2. **Energy Queensland – support** • Ergon Energy and Energex agree that there are differences in load types, and consequently, their capabilities and thus performance obligations. As such, support Option 2. **TasNetworks – support** • TasNetworks supports the premise that loads be required to support network stability as much as they are technically capable of. It is understood that inverter based loads (IBL) have some additional capabilities over	AEMO has revised its policy position and recommends to apply the same access standards to large single facility loads of all technology types. The specific circumstances of individual loads, including their technology and location in the network, would need to be considered when the performance standard is considered. This means that the MAS would need to be sufficiently flexible to allow for the connection of any load whose performance is not expected to have a material impact on the power system. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report. This would include the treatment of different load technologies. Details of AEMO's considerations are provided in section 4.3.2 of the final report.

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
	"traditional" loads. This greater flexibility in voltage and frequency control should be recognised in their connection standards so these capabilities are provided to the system. However, the rules should not prevent other load types that have capability from also being required to participate if required. TasNetworks would want the ability to negotiate solutions with parties regardless of the technology type as appropriate. TasNetworks therefore supports option 2. **Transgrid – support** • Agrees with the recommendation to pursue Option 2, to consider IBL ride through requirement and general requirements for load separately.	
Size and technology-based thresholds for ride through capability requirements	**AGL – partial support** • AGL would like more information on how dynamic load would be treated should thresholds be set before providing a view on the best policy approach. **AMP – oppose, propose alternative** • As outlined above, we generally support technical requirements set based on the impact on the network and hence size can be used as a good indicator. Technology-based requirements can hinder investment in certain types of technology. • The argument to "capture the inherent low-cost ride-through capability of many IBL" is not a really valid reason to set a higher requirement on IBL compared to "other" loads. If it is an inherent performance at no cost to an IBL project, it can be captured easily in its relevant technical performance standard as long as all relevant parties are comfortable with it. However, if it becomes a mandate in the rule, it will trigger the need for detailed modelling, tuning and potential additional equipment to be compliant with the rule which means additional cost to IBL projects compared to "other" load projects which may have similar sizes and network impacts. This is not a fair approach and does not align with the NEO. In addition, as noted above there are many types of IBL technology and a number of them are still under development, having a very strict/high technical requirement can hinder efficient development and investment in this area. • Therefore, we do not support AEMO's proposal. We support Option 3 and a careful consideration of Option 1. **AusNet – support** • AusNet supports the proposed Option 2 and Option 3. **Energy Queensland – support** • In our view, the proposed approach is reasonable. However, Ergon Energy and Energex is interested in how the technical capability of the plant will be determined in order to inform whether the proposed protection sections are reasonable. **Powerlink – oppose, propose alternative** • Large loads, irrespective of their type (inverter based or non-inverter based), have the potential to impact inter and intra area transfer limits and power system security in the absence of appropriate Fault Ride Through (FRT) capability. Depending on the technology used, some loads may be able to offer ride through functionality but others may not. We suggest that Schedule 5.3 should allow Network Service Providers (NSP) to negotiate the details of dynamic performance (e.g. FRT, response to voltage and frequency disturbance) with the load prior to making an offer to connect. **TasNetworks – support**	AEMO has revised its policy position and recommends considering all types of loads equally. This means that the recommended size thresholds for the IBL and other loads are the same, and a definition of "large single facility inverter-based load" would not be necessary. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report. This would include the use of different size thresholds. Details of AEMO's considerations are provided in section 4.3.3 of the final report.

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
	• TasNetworks supports the view that any inherent capability to remain in operation for a disturbance of some limited magnitude and duration should be required to be provided to the extent reasonably possible. It is critical this ability is able to be tailored to local requirements as this is most likely to see a positive cost benefit to consumers. It is expected that ensuring contingency requirements are reduced would ensure the overall objectives of the National Electricity Objective (NEO) are met. TasNetworks support options 2 and 3. **Transgrid – support** • Transgrid agree with the recommendation to pursue Option 2 to apply different thresholds for traditional loads and IBL in combination with Option 3 MAS for all single facilities loads of 5 MW or more. It is worth noting that, any threshold proposed should be consistent with any other ongoing consultations, such as the PSMG.	
7.3.2 Treatment of different load technologies within a load facility	**AGL – support, with clarifications** • AusNet supports the proposed Option 2. • AGL's view is that if a "single facility load" is classified as a "large single facility IBL" because it contains multiple technology types with a large quantity of IBL, that any MAS ride through requirements imposed on that load be limited to the IBL MW quantity and not the entire MW quantity of the facility. **AMP – oppose, propose alternative** • see previous comments **AusNet – support** • AusNet supports the proposed Option 2. **Energy Queensland - support** • While Ergon Energy and Energex do not disagree that the IBL component is the appropriate threshold, it is not clear how the ride-through performance for a facility with a combination of technologies will be assessed. We seek clarity if this will be conducted through modelling. **EUAA – oppose (as not practical)** • While AEMO's proposed requirements and thresholds may be practical for application to datacentres and H2 facilities that consist of many identical modular, mono-technology systems, the application of the same requirements to facilities that are more complex may have unintended consequences. • Many large industrial sites that are involved in material processing, manufacturing or mining have extensive onsite distribution networks and loads that will, in aggregate, meet these thresholds. However, they are often compromised of many hundreds or thousands of different individual loads from various suppliers and vary in size, function and capability. Additionally, these sites are rarely static and are often subject to continuous ongoing change due to operational requirements. Some examples of constant change that these changes may complicate include electrical reconfiguration due to onsite network switching, replacement of equipment (with like-for-like not always possible or desirable) or equipment relocation. **TasNetworks – support** • Supports option 2, to accommodate different load technologies within a load facility. **Transgrid – support (concern on practical implementation)** • Agrees with the recommended approach of Option 2 in principle, to apply different thresholds based on the size of the IBL load component and the size of the traditional load component. However, consideration may	AEMO agrees with stakeholders that loads often include multiple technologies, and there may be practical difficulties in applying different thresholds and standards based on the types of loads within a facility. AEMO has revised its policy position to recommend considering all types of loads equally. This means that a load with multiple technologies would be assessed against single size threshold. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report. This would include the treatment of different load technologies within a load facility. Details of AEMO's considerations is provided in section 4.3.4 of the final report.

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
	need to be given to the fact that it may be challenging to distinguish between the load components in some hybrid facilities and effectively design the protection systems as per the requirements in each load category.	
Continuous uninterrupted operation (CUO) requirements	**AGL – support** • AGL strongly rejects Option 1, which would impose the NER definition of CUO on load connections, as the matters covered in (a)-(d) of the NER definition are simply not appropriate for loads. • AGL supports Option 3, to apply a light-handed approach to CUO that excludes the requirement not to exacerbate or prolong the disturbance or cause a subsequent disturbance for other connected plant. • The reason for our preference of Option 3 over the recommended Option 2 is because proving causation of which load connection, if any, exacerbated or prolonged a disturbance is difficult to definitively identify with currently available monitoring equipment. We suggest its preferable to leave this problematic requirement out of the NER until such time as reliable methods of detecting causation are available. • Additionally, AGL notes that pumped hydro technology cannot meet an active power tolerance requirement, whether set as a percentage or as a MW limit. The NER must allow for technological limitations. **AMP – support** • Generally supports proposal but would like to propose that the tolerance size needs to be reviewed carefully. **AusNet – partial support** • AusNet supports the proposed Option 2 but questions the basis of the proposed 20% tolerance or 100 MW limit. This is different to the equivalent requirement on generating systems relates to active power change is as permitted by relevant access standards. **Energy Queensland – support** • Ergon Energy and Energex agree that part (d) is a key consideration for any continuous uninterrupted operation (CUO). **EUAA – need more information** • AEMO has not demonstrated the need to have active power thresholds (or otherwise) in either CUO or UPS systems for all of the defined load types. • EUAA recommends that AEMO obtains and provides evidence for the inclusion of CUO requirements and UPS in each of the proposed defined load types prior to their inclusion. **TasNetworks – support** • TasNetworks supports option 2, the application of a light-handed approach to CUO that includes part (d) of the CUO definition. **Transgrid – support** • Agrees with the recommended approach of Option 2, however would suggest an alteration to the change in active power limit allowable to be the lesser of a fixed MW value or 20% following a disturbance.	AEMO has considered views on whether light handed CUO should include a requirement to "not materially exacerbate or prolong the disturbance …". This requirement is important for maintaining the security of the power system, and AEMO does not consider there are good reasons to remove it. Responses were divided over what allowance should be made for active power response. On further consideration AEMO has decided that the tolerance might better be considered separately in each clause for which CUO applies. For example, an active power response that opposes a frequency change is a desirable power system response, even when it reduces active power consumption. The impact of tripping loads during contingency events has both a local voltage and system-wide impact, and is not desirable as a rule. However, some load types may not be as capable of riding through contingency events as others, so allowance needs to be made in the MAS for this. Likewise, some loads have voltage-dependency, and allowance needs to be made for this. Details of AEMO's considerations are provided in section 4.3.5 and 4.5 of the final report for overall consideration of the CUO light definition, and frequency disturbance response, contingency event response and voltage disturbance response, respectively. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report. This would include the appropriate specification of CUO load facilities.
Treatment of loads with uninterruptible power supplies (UPS)	**AusNet – support in principle** • AusNet supports the proposed Option 1.	Most respondents supported no separate treatment for UPSs. AEMO agree that UPS disconnection has the same impact on the network as tripping a load. AEMO is not proposing to change its policy position that UPS

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
	• AusNet suggests AEMO should also define and add UPS to the new definitions for use with ride through requirements. UPS need to have backup energy sources while IBLs do not. Given the additional requirements that will apply to loads with uninterruptible power supplies, this clarity of terms would be required. **AMP – support** • We generally support AEMO's proposal. **EUAA – need more information** • AEMO has not demonstrated the need to have active power thresholds (or otherwise) in either CUO or UPS systems for all of the defined load types. • EUAA recommends that AEMO obtains and provides evidence for the inclusion of CUO requirements and UPS in each of the proposed defined load types prior to their inclusion. **TasNetworks – support** • TasNetworks support option 1, treating large loads with uninterruptible power supplies (UPS) in the same way as other large loads. Regardless of whether a load has UPS the effect on the network of it islanding is the same as it disconnecting. We acknowledge that some UPS type installations may support the network through a disturbance. However, as AEMO points out, these will be addressed through the new Integrated Resource Provider category. **Transgrid – support** • Agrees that loads with UPS should not be able to disconnect at will from the grid, particularly when they can be relatively large, and should follow similar thresholds as other large loads (traditional or IBL), noting that there is provision in the wording suggested for the CUO Option 2 that there can be agreement between the NSP and AEMO to alter the requirement on a case-by-case basis.	loads should be treated no differently from other large load facilities. AEMO, therefore, does not anticipate any need for separate definition of UPS in the NER. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report. This would include the treatment of UPS load facilities.
AEMO advisory matters	**AusNet – support** • AusNet agrees with Option 2 given the equivalent ride through requirements under S5.2 which are AEMO advisory matters. **Energy Queensland – support** • Ergon Energy and Energex are supportive of Option 2. • Reiterates our response to the S5.2 consultation in terms of retaining existing AEMO advisory thresholds for generating systems. We suggest that the thresholds for loads and generation should be consistent. **TasNetworks – supports** • Supports option 2, prescribing load access standards that relate to AEMO's system security functions under the National Electricity Law (NEL) to be AEMO advisory matters. This will assist in negotiations with proponents who may seek to align standards between regions. **Transgrid – support** • Agrees with the recommendation of Option 2 to consult with AEMO when negotiating an access standard that relates to AEMO's system security function under the NEL.	AEMO notes that most stakeholders support the draft recommendation of prescribing that load access standards that relate to AEMO's system security functions under the National Electricity Law (NEL) to be AEMO advisory matters. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report. This would include the requirements that should be designated as AEMO advisory matters. Any size threshold applied would be made consistent across schedules 5.2 and 5.3.

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
New definitions – for use with ride through requirements		
Single facility load	**AusNet – support** • AusNet agrees with the definition. **EUAA – question raised** • An EUAA member in discussion with AEMO queried the application of the proposed definition to railway facilities which have multiple connection points, where a fault at one location could result in the shutdown of part of the rail network for safety reasons. **TasNetworks – support** • Supports option 1. It will provide added clarity to the threshold for assessment under Schedule 5.3. The flexibility for the local network service provider to adjust the threshold to account for local conditions is important. **Transgrid – generally support** • Recommends that "electrical proximity" be clearly defined and remain as consistent as possible with the existing definition of "connection point" under the rules (Chapter 10).	Most stakeholders agreed with the general concept proposed for a single facility load. In response to the EUAA question and Transgrid's comment regarding electrical proximity, AEMO intends that the definition applies when multiple connection points are affected by the same power system disturbances, rather than indirect impacts such as the one described. AEMO has proposed a minor wording change to capture this distinction, described in section 4.3.1 of the report.
Large single facility load	**AusNet – support** • AusNet agrees with the definition. **ElectraNet – propose alternative** • The definition of arbitrary MW threshold across vast areas is counterproductive, defined in section 4.3. • ElectraNet proposes that the NSP is responsible for defining and publishing the localised MW thresholds best suited to their specific network configuration. **EUAA – need more information** • AEMO has not demonstrated the need for traditional loads greater than 200MW and having less than 30MW IBL (or other level of IBL) to be required to meet the requirements of the proposed rule change. • Many of EUAA's members have in excess of 200MW loads, and to their knowledge, have not caused system security events and have little knowledge of system security events that their facilities have "ridden through" unless they have been contacted directly by AEMO or their NSP when a credible or non-credible contingency event has been predicted. • Without the evidence of system security issues caused by non-ride through of the contingency events, either by AEMO or consumers, it is impossible to comment on whether 200MW is the correct threshold. • The EUAA agree with its members' assertions that Large Single Load Facilities with traditional loads should not be included in the new load connection requirements. This aligns with AEMO's thesis that large, clustered IBL are the major concern. • The EUAA recommends that AEMO obtains and provides evidence for including traditional loads in the current proposed rule change rather than including these loads because they align with the current thresholds for generator connections. **TasNetworks – support**	Several stakeholders questioned the recommended 200 MW size threshold. Network users preferred the ride through requirements to apply only to IBL, or IBL components of a load facility. AEMO has considered its proposed recommendations further and has revised its position. As discussed in sections 4.3 and 4.4.1 of the final report a key consideration in determining an appropriate threshold is the efficient investment in and operation and efficient use of electricity services, as required by the NEO. The analysis should consider whether it is more efficient for the NSP and AEMO to manage the impact of load collectively or for each load to be responsible for its own impact. As discussed in the Draft Report, the cumulative effect of multiple loads tripping for the same power system disturbance is also an important factor in assessing the size of the threshold. The impact on the power system of an event will depend on the size of the power system in question – Tasmania and the mainland can be considered effectively as separate systems as they are coupled only lightly (because of the DC interconnection). The size of the largest contingency event can be considered as a measure of the power system's disturbance size tolerance.

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
	• Supports defining "large single facility load" as a "single facility load" equal to or greater than a size threshold that is the minimum of the regional maximum load contingency size. The presumption is that each discrete load component is treated separately in an analogous way that a generating system can made up of multiple generating units each below the threshold. **Transgrid – need more information** • Would like to understand the basis for the 200 MW threshold proposed to define a large single facility load for the purpose of imposing ride through requirements. Without understanding the basis for this threshold, Transgrid is unable to make a determination on the suitability of the definition of large single facility load.	As noted below and discussed in sections 4.3.2 of the final report, AEMO has updated its recommendation and currently considers removing IBL from the application threshold, noting the technology will be considered in determining a negotiated access standard. The revised size threshold tentatively proposed for large single facility load is: the smaller of: • 120 MW, which is 20% of the largest single contingency event on the mainland of 600 MW; or • 20% of the largest single contingency event defined in the Frequency Operating Standard for the region (if any). The largest single load contingency in the Frequency Operating Standards for Tasmania is 144 MW, which results in a 28.8 MW threshold for Tasmania. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report. This would include the definition of large single facility load.
Large single facility IBL	**AGL – support** • AGL supports Option 3, in keeping with the view stated in response to the first matter on page one that IBL under a certain MW threshold should not be subject to the same stringent requirements as larger IBL, given their lesser impact on the power system. AGL cautions that setting technical requirements higher than necessary, as a 'nice to have' rather than a 'need to have' poses a significant barrier to entry that when added up, will have the practical effect of slowing the energy transition. **AusNet – support** • AusNet agrees with the definition. **ElectraNet – propose alternative** • The definition of arbitrary MW threshold across vast areas is counterproductive, defined in section 7.4. • ElectraNet proposes that the NSP is responsible for defining and publishing the localised MW thresholds best suited to their specific network configuration. • ElectraNet also agrees and supports the recommended option 1 for clause 4.3.3. **EUAA – propose alternative** • The current definition of Inverter-Based Load in the NER is not clear and may be misinterpreted by consumers. EUAA understands that it is AEMO's intention to include rectifiers, variable frequency and variable speed drives etc in the current proposed rule change. EUAA recommends that AEMO re-write the	Based on submissions on related issues and further consideration of feedback, AEMO recognises that applying different size thresholds to traditional loads and IBL is not always practical and appropriate. AEMO also acknowledges that there can be ambiguity as to what constitutes an inverter-based load. Therefore, (as discussed above) AEMO has revised its policy position and considers that all load types should have the same access standards. The specific circumstances of individual loads, including their technology and location in the network would be considered in negotiating the appropriate level of access. This means that the MAS would need to be sufficiently flexible to allow for the connection of any load when its performance does not have a material impact on the power system. Details of AEMO's considerations are provided in section 4.3.2 of the report. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for

Issue	Schedule 5.3 Load Recommendation feedback summary – Policy issues	AEMO response
	definition to be clear and not open to interpretation or "grey" areas. Should new technologies be created in the future, the definition can be updated as required. • AEMO advised in meetings that the thresholds were chosen to align with existing generator connection thresholds. This is inappropriate as it does not take into account the likely size of the impact of the potential system security events that concern AEMO. In addition, the current generator thresholds existed prior to inverter-based generation joining the NEM. EUAA suggests that AEMO obtains and provides evidence for the potential system security impacts for the thresholds for each definition, rather than aligning the thresholds with the existing generator thresholds. • Many of EUAA's members have in excess of 30MW of IBL, and to their knowledge, have not been part of, or caused a feedback loop contingency event or created system security issues. EUAA members believe that the evidence will suggest a threshold of 50-100MW of IBL, which would be more practical, manageable by all electricity participants and would resolve the issues highlighted in AEMO's thesis. **TasNetworks – support** • Supports AEMO's recommended definition. **Tesla – propose alternative** • The definition should be made much clearer and remove any element that includes NSP discretion. A simple definition would be: – Bidirectional inverter based loads such as BESS assets should have a 5MW threshold attached (note that this could be linked to the bidirectional unit definition in the NER for clarity). – All other inverter based loads have a 30MW threshold. **Transgrid – support similar alternative** • Transgrid prefers Option 2, for the definition to apply for a 5 MW or more IBL, with discretion for the NSP to exempt up to a threshold of 30 MW. This is more consistent with the current threshold/s for generator technical requirements.	ride-through requirements for large loads, considering the principles recommended in this report. This would include whether a different size threshold should apply to IBL.

4 Feedback on specific clauses in S5.3

Issue	Schedule 5.3 Load Recommendation feedback summary – Specific clauses	AEMO response
New clauses for ride through		
Application of policy for recognition of different load technologies	**AMP – support** • Generally supports AEMO's proposal but would like to note that the connection process needs to be efficient so that it does not slow down investment and connection of new loads unnecessarily. From the experience of generator connections, the performance standard negotiation can cause significant delay to new projects especially with the need to aim for AAS. **AusNet – partial support** • For large single facility loads, AusNet supports the proposed Option 2. • For large single facility IBL, AusNet does not support Option 4, based on the noted barriers to connection for IBL loads without the expected ride through capability. AusNet supports Option 5 to retain flexibility for provisions of a less arduous MAS than the equivalent generator standard, which would ensure the industry can capture the prevalence of such loads. **EUAA – some concerns around flexibility** • In developing Automatic Access Standards (AAS) and Minimum Access Standards (MAS) for frequency disturbances, contingency events and voltage disturbances, AEMO needs to ensure that currently available equipment and existing in-use equipment can meet the requirements as well as ensuring that the requirements are not onerous. This should be evidence based and not set using arbitrary theoretical limits. • EUAA can see two scenarios occurring: – A new greenfields site is proposed that is required to meet the standards and a piece of equipment is unable to meet the standards, thus losing the investment. – An existing brownfields site triggers the proposed rule change through an upgrade/expansion to the site and is unable to meet the standard across the whole site due to existing equipment failing to meet the standard. **TasNetworks – concerns around flexibility and the level of standards** • TasNetworks considers allowing for maximum flexibility in negotiating with loads will be critical in allowing loads to connect in a timely manner given circumstances and technical capabilities can vary widely. Thus, it is probable that minimum access standards should be able to set at 'null' capability. However, where the plant is capable of supporting the operation of the network this capability should be provided. • The standard needs to recognise that setting the automatic access standard too high would require all loads to negotiate its connection standards which is resource intensive and could unnecessarily delay projects. It is therefore important that AEMO continue to consult to ensure an appropriate balance between flexibility and simplicity is achieved. **Transgrid – support in principle**	AusNet, EUAA and TasNetworks all commented on the need for flexibility in the standards to be applied, especially in relation to the minimum access standard associated with IBL. As previously described, AEMO has revised its proposed position to treat all loads with the same threshold and not to distinguish between technologies, since the impact of a load trip depends on its size and reactive power rather than its technology. Considering the concerns around flexibility raised by stakeholders, AEMO has decided not to distinguish access standard requirements on the basis of IBL or other technology. This means that the standards must be written with a high degree of flexibility to account for a wide range of technologies and capabilities. AEMO acknowledges that this makes the negotiation range wider, which might be less efficient, but it also should make it less likely that a load is unable to connect because meeting the standards makes the project uneconomic. AEMO believes the threshold set for a large single facility load will help to reduce the resource burden overall by targeting an appropriate size of load to which these additional ride-through requirements will apply. AEMO also acknowledges TasNetworks' concern about setting the access standards too high. AEMO has considered each of the frequency, contingency and voltage ride-through requirements in more detail, in the update report and discussion below. However, AEMO would welcome further feedback on whether we have set an appropriate level for AAS and MAS in each case. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements for large loads, considering the principles recommended in this report.

Issue	Schedule 5.3 Load Recommendation feedback summary – Specific clauses	AEMO response
	• Do not want to create a barrier for loads to connect. AEMO should conduct further engagement with load proponents of different types of technologies and have a survey of various capabilities to determine if the MAS as proposed is a suitable threshold.	
New clause – frequency disturbance ride through		
Operation of large loads during frequency disturbances	**AGL – generally support** • For both large single facility loads and IBL, where load is providing a service (e.g., PFR, FCAS, inertia), service provision must take precedence over the ride-through requirements. • For large single facility loads, AGL supports Option 1, which is consistent with the characteristics and capability of non-inverter-based loads. • For IBL (above a size threshold), AGL supports Option 4. **AusNet – support** • AusNet supports the proposed Option 2. **Energy Queensland – support** • Ergon Energy and Energex consider that a clear definition for the required CUO performance for inverter-based loads forms an essential part of the new performance standards and agree that requirements similar to generators is appropriate. **Powerlink – support** • Powerlink supports defining a minimum access standard for operation of large loads during frequency disturbance. Care should be exercised while defining minimum access standards so that the NSP can offer flexibility to load connections if the new load connection does not prevent the NSP meeting the required system standards. **TasNetworks – support** • Supports AEMO's recommended action.	AEMO notes stakeholders' general support for the recommended approach. As previously noted, AEMO is proposing not to have separate requirements for IBL and other load, but to have a wider range of performance requirements. AEMO agrees with AGL that the standard should allow for appropriate frequency response opposing a frequency change and for inertial response, which will both affect active power during a frequency disturbance. AEMO is proposing the MAS CUO requirement to be defined only for frequency ranges associated with load and generation events. Considering the latest FOS, a generator or load contingency and the containment band without islanding this corresponds to: • 49. 5 Hz – 50.5 Hz on the mainland • 48.0 Hz – 52.0 Hz in Tasmania The corresponding rate of change of frequency (ROCOF) requirements are +/-1 Hz/s for the mainland and +/-3 Hz/s for Tasmania. To allow further flexibility AEMO proposes to allow some partial tripping under the MAS for underfrequency events, and to allow Schedule 5.3 Participants to enter into a commercial arrangement with another party to meet the performance standard. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements, considering the principles recommended in this report. These access standards would include requirements for frequency disturbances.
AEMO advisory matter	**TasNetworks – support** • Supports AEMO advisory being applied.	AEMO notes TasNetworks' support for this to be an AEMO advisory matter and will retain its recommendation. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements, considering the principles

Issue	Schedule 5.3 Load Recommendation feedback summary – Specific clauses	AEMO response
		recommended in this report. This would include whether this should be an AEMO advisory matter.
New clause – contingency event ride through		
Operation of large loads during contingency events	**AGL – support** • Considers that the NER must differentiate between IBL and non-IBL, to reflect the different capabilities of these technologies. In addition, and as stated in response to the new definition of "large single facility load" above, any requirements placed on a facility must only place higher obligations on the IBL proportion of the overall facility. **AMP – partially support and propose alternative** • Generally agrees with AEMO that Option 1 "Do nothing" is not preferred. However, AEMO's proposal to go with Option 2 can pose significant barriers to connection of new loads. The assumption that IBL have inherent fault ride through capability needs to be confirmed and well analysed to understand what can and cannot be achieved and the potential impact on the network, especially with the multiple fault ride through requirements. Careful consideration needs to be given to not only the capability of the inverter-based interface (e.g., power electronics converters) of the load but also the remaining components of the load facility to comply with the multiple fault ride through requirements. • For example, an ammonia production plant can have steam turbine generators to use the excessive steam generated in the production process. It also has various types of compressors. The capability of those components to ride through multiple faults will vary. It is also unclear what are the exact clauses in S5.2.5.5 will be applied to IBL, especially whether any reactive current support is required. **AusNet – support** • AusNet supports Option 2 and proposes that provisions for a less arduous MAS should be determined by NSP/AEMO on a case-by-case basis (e.g. smaller plant above 5MW but below 30MW which are likely to connect to distribution networks). **TasNetworks – support** • Supports AEMO's recommended action. **Transgrid – support in principle** • It is uncertain whether AEMO's intention is for IBLs to provide reactive power supply or absorption capability as per AAS and MAS of S5.2.5.5 given the wording on being 'consistent' with that clause. Transgrid sees that may be an issue and further discussion will be required.	AEMO notes stakeholders general support for the approach in principle, but some respondents raised concerns about flexibility and queried whether a reactive current injection/absorption requirement was intended. AEMO agrees with AGL's concern that traditional loads and IBL can have quite different inherent capability, and notes that these different capabilities would be considered during the negotiation of the access standards appropriate for a specific load connection. As previously mentioned, because the revised standards apply to all technologies there will need to be a wide range between performance requirement at AAS and MAS levels. There is no proposal to include reactive current injection or absorption requirements. The AAS is proposed to include multiple fault ride through and single credible contingency events, consistent with S5.2.5.5. To allow sufficient flexibility in the MAS, only single credible contingencies are considered, and AEMO proposes to make the requirement for CUO for credible contingencies subject to the voltage ranges for CUO agreed for voltage disturbances. This means that, where necessary, contingencies that cause large voltage dips or spikes can be excluded from the ride-through requirements. AEMO also proposes that with the agreement of the NSP and AEMO, the Schedule 5.3 Participant may enter into a commercial arrangement with another party to meet the performance standard. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements, considering the principles recommended in this report. These access standards would include requirements for contingency events.

Issue	Schedule 5.3 Load Recommendation feedback summary – Specific clauses	AEMO response
AEMO advisory matter	**TasNetworks – support** • Supports AEMO advisory being applied.	AEMO notes TasNetworks' support for this to be an AEMO advisory matter and will retain its recommendation. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements, considering the principles recommended in this report. This would include whether this should be an AEMO advisory matter.
New clause – voltage disturbance ride through		
Operation of large loads during voltage disturbances	**AGL – support** • See AGL comments on frequency disturbances and contingency ride through. **AMP – partially support and propose alternative** • Generally agrees with AEMO that Option 1 "Do nothing" is not preferred. However, AEMO's proposal to go with Option 2 can pose significant barriers to connection of new loads. It is well known that the S5.2.5.4 AAS requirements have caused several issues to new inverter-based connections in the last 4-5 years and in some cases resulting in significant additional CAPEX. Therefore, AEMO should carefully review and update Option 2 accordingly, especially the application of S5.2.5.4 AAS. We propose a new option which is similar to Option 2 but without the S5.2.5.4 AAS or with a modified (less onerous version) of S5.2.5.4 AAS. **AusNet – support** • AusNet supports the proposed Option 2. **Powerlink – support** • Supports defining a minimum access standard for operation of large loads during voltage disturbance. Care should be exercised while defining minimum access standards so that the NSP can offer flexibility to load connections if the new load connection does not prevent the NSP meeting the required system standards. **TasNetworks – support** • Supports AEMO's recommended action.	AEMO notes stakeholders general support for the recommended approach. AEMO proposes to retain the AAS consistent with the AAS of S5.2.5.4. In response to flexibility concerns raised by AMP and Powerlink, AEMO's revised recommendation is for a MAS requiring only ride through for 90 – 110% of nominal voltage for this clause. AEMO considers it appropriate that, with the agreement of the NSP and AEMO, the Schedule 5.3 Participant may enter into a commercial arrangement with another party to meet the performance standard. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements, considering the principles recommended in this report. These access standards would include requirements for voltage disturbances.
AEMO advisory matter	**TasNetworks – support** • Supports AEMO advisory being applied.	AEMO notes TasNetworks' support for this to be an AEMO advisory matter and will retain its recommendation. AEMO intends to undertake further consultation and investigation to finalise detailed access standards for ride-through requirements, considering the principles recommended in this report. This would include whether this should be an AEMO advisory matter.

Issue	Schedule 5.3 Load Recommendation feedback summary – Specific clauses	AEMO response
NER S5.3.3 – protection systems and settings		
Link to 'ride through' requirements and maximising protection	**AGL – support** • AGL supports Option 2, noting that where load is providing a service (e.g., PFR, FCAS, inertia), service provision takes precedence over the requirement to comply with S5.3.3 obligations. **AMP – support** • Generally supports AEMO's proposal. **AusNet – support** • AusNet supports Option 2. **TasNetworks – support** • Supports AEMO's recommended action. **Transgrid – support in principle** • How will the protection systems distinguish between the different types of load components in a hybrid facility and be effectively designed.	AEMO notes stakeholder support for loads maximising their inherent ride through capability. AEMO agrees with Transgrid that the application of this requirement may not always be straight forward but it considers that requirement could be applied at either a large plant level or at a site level. Therefore, AEMO is not proposing to change its policy position.
AEMO advisory matter	**AusNet – support** • Agrees that the clause should not be an AEMO advisory matter, as AEMO's input would be captured under preceding ride through clauses.	AEMO notes AusNet's support for this not to be an AEMO advisory matter and will retain its recommendation.
NER S5.3.10 – Load shedding facilities		
Emergency under-frequency ramp down of large loads	**AGL – support** • AGL supports Option 2, allowing load to remain connected where alternative options to ramp down are agreed. We suggest that any ramping requirements specify the load must ramp down proportionally. **AMP – support** • We generally support AEMO's proposal. **AusNet – support** • AusNet supports the proposed Option 2. **Energy Queensland – support** • While the ramping option introduces options in design of under-frequency load shedding schemes, it also introduces additional complexity in the design of such schemes, which for DNSPs, are already complex. For example, DNSPs must consider distribution feeders that may be net generators during certain periods. Therefore, we suggest consideration should be given on a case-by-case basis as to whether this approach is practical for the load and the affected network. **TasNetworks – support with recommendation** • Recommends the threshold be maintained at 10MW, with loads proposing how they can meet the requirement. The proposed solution must meet the requirements of the service being provide. For example, a ramp in output	AEMO notes that stakeholders support the draft recommendation of providing flexibility in the way large loads can provide emergency under-frequency ramp down. AEMO agrees with Energy Queensland that the option to ramp instead of tripping should be considered on a case-by-case basis. Therefore, AEMO is not proposing to change its policy position, other than to clarify that any ramping arrangement must be agreed with AEMO and the NSP, and to allow for a combination of tripping and ramping also to be agreed.

Issue	Schedule 5.3 Load Recommendation feedback summary – Specific clauses	AEMO response
	must be provided when required and not delayed to when it is more convenient to the plant. This obligation should remain for load connections and not be commercialised as a "service". **Transgrid – support in principle** • Providing alternatives for the proponents to incorporate proportional ramping down functionalities if it is suitable for the specific system conditions of the time.	
New clause for instability monitoring and prevention		
Stability of IBL – monitoring, protection and performance	**AusNet – partially support** • AGL does not support Option 2. • AGL supports Options 3 and 7, as sensible, proportionate actions. • AGL does not support Options 4, 5 and 6. Firstly, despite the references AEMO has provided to the Efficient Management of System Strength on the Power System rule and the system strength impact assessment guidelines, our practical experience is that the meaning of "instability" is not always clear. Secondly, and as we have mentioned elsewhere in our feedback, detection devices that can determine a facility's contribution to an instability are not yet widely available and this remains an emerging area. The NER should keep pace with such developments, but not precede them. • AGL's view is that Option 8 be considered separately, rather than having oscillations bundled as part of "stability". **AMP – partial support** • Supports Options 3, 7, 8. We caution that careful consideration needs to be given to Options 5 and 6 (which AEMO propose). **AusNet – support** • AusNet supports the proposed Options 6,7,8. • AusNet agrees IBL loads carry increased instability risk which AEMO proposes would be managed through further obligation for protection requirements. However, AusNet does not support Option 3 that limits monitoring to only IBL. We consider that monitoring should be applicable more broadly to all loads as defined in Option 2. This recognises that all large loads are expected to maintain stable performance. • AusNet supports Option 5 in principal that protection requirements should apply to single facility loads with IBL but does not support the simple 20MW threshold defined. For smaller plant (above 5 MW), it should be up to the NSP to determine on a case-by-case basis as it is plausible for NSP's to require implementation of protection for smaller plants looking to connect to weak parts of the distribution network. **TasNetworks – support** • Supports AEMO's recommended action. **Transgrid – propose alternative** • Suggests the ongoing consultation for clause S5.2.5.10 be finalised prior to an equivalent clause for IBL loads, and this be fully investigated following the conclusions from that consultation. Further consideration should be given to the appropriate thresholds for such a clause, as the specific levels proposed may not be appropriate.	The options considered in the Draft Report Addendum for monitoring and protection actions were: 1. Do nothing – no monitoring or protection. 2. Require monitoring for single facility loads ≥[5] MW. 3. Require monitoring for single facility loads with IBL components ≥[5] MW. 4. Require protection for instability for single facility loads ≥[20] MW. 5. Require protection for instability for single facility loads with IBL components ≥[20] MW. 6. In the AAS, require detection devices that can determine the contribution to an instability. 7. In the AAS, permit alternative actions to tripping (to reduce instability). 8. Require single facility loads to not to cause an oscillation that is not adequately damped and does not amplify any oscillation. (Amend NER S5.3.11 MAS). AEMO recommended Options 3, 5, 6, 7 and 8 in the Addendum. This was closely aligned with the equivalent recommended requirements for generators captured under NER S5.2.5.10. AEMO received extensive feedback on NER S5.2.5.10 and on the Addendum for NER S5.3. The detailed discussion on instability monitoring and protection is in the Draft Recommendations Update Report (Part 1) relating to NER Schedules 5.2 and 5.3a. AEMO continues to recommend aligning the requirements for large loads with the requirements for generators in NER S5.2.5.10. AEMO notes that the recommended requirement for stability monitoring and protection should not apply to all loads, and AEMO is recommending that a load can be

Issue	Schedule 5.3 Load Recommendation feedback summary – Specific clauses	AEMO response
		exempted from the requirements if it cannot actively participate in instabilities. See section 4.8.1 of the final report for the full description.
AEMO advisory matter	**TasNetworks – support** • Supports AEMO advisory being applied.	AEMO notes TasNetworks' support for this to be an AEMO advisory matter and will retain its recommendation.