



Electricity Authority

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Part 8 Code amendment proposal – Part 1

Transpower welcomes the opportunity to submit to the Electricity Authority's (Authority's) parallel consultations for Part 8 Code amendments and Information provision, published 1 October 2024, under the Common Quality Requirements Review programme. This submission is on Part 8 Code amendments.

As the proposed Code amendments more directly impact the system operator (SO), this submission is from Transpower primarily in that role. We indicate in the appendix where Transpower, in its role as grid owner (GO), provides its view.

Part 8 Code amendments

The suite of nine Code amendments is an important step to ensure the Code can be applied in the significantly changed technology environment from when the common quality performance requirements were created.

Specifically, evaluation processes used by the SO for dispensation or equivalence arrangements with owners of Inverter Based Resource (IBR) assets, should be reduced by updating the Code to be enabling for all technologies.

We agree with many of the nine Code amendments proposed but draw attention to the following three proposals.

- **FSR 007** to provide that BESS (battery energy storage system) is considered as generation under Part 8. The proposal covers only charging and discharging. In our view, the proposal should be clear about ESS obligations when operating in the standby mode - at 0 MW and 0 MVAR - to match generator obligations. Clarity on obligations when transitioning in and out of standby mode will support the SO to configure the online operational tools to accurately model the ESS capability, and to monitor compliance.
- **FSR 008** the proposed definition for a *generating unit* still has workability issues. The Authority should consider an option to define generating unit in a document incorporated into the Code which could present more detail around string level units and hybrid plants, and enable future technologies to be included as they are developed.
- We do not support **FSR 009** (deeming compliance for machine-based synchronous generating units), rather we favour accelerating work to establish clear FRT criteria for synchronous generators. We accept that synchronous and inverter-based generation technologies are different. However, whilst the proposal removes the requirements and

transactional costs associated with dispensations, the SO and asset owners would still need to complete assessments of FRT compliance. The new 'test' under the proposed clause is likely to introduce ambiguity, particularly in proposed subclause 7 (c).¹

Yours sincerely

Joel Cook
Head of Regulation

¹ ... (c) the generator has taken all reasonable measures to support the stability of the grid taking into account the generating unit's inherent stability characteristics.

Appendix A – Response to Part 8 Code Amendments

Part 8 Code amendment proposal – Part 1

Submitter Transpower, primarily as system operator (SO). We indicate below where Transpower responds as grid owner (GO).

<p>FSR-001: Remove the exclusion for wind-powered generation from periodic testing</p>	
<p>Q1.1. Do you support the Authority’s proposal to apply the periodic testing requirements in Appendix B of Technical Code A of Schedule 8.3 to wind generation? If you disagree, please give reasons and provide alternatives that address the identified problem with wind generation being excluded from the periodic testing requirements.</p>	<p>Yes, for the reasons outlined by the Authority.</p> <p>We support the Authority proposal as we see two benefits from this change:</p> <ol style="list-style-type: none"> 1) Provide an opportunity for asset owner and SO to re-assess the performance and update the ACS and generator model if required. This is important from a whole-of-system security perspective. As SO we rely on asset owner data to model and to assess system security. 2) Provide a level playing ground for all inverter-based generation as solar and BESS are not exempted from these requirements.
<p>Q1.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.</p>	<p>We support the Authority’s transition period for the Asset Owners to comply with the proposed change for two reasons:</p> <ol style="list-style-type: none"> 1) To avoid a sudden increase in workload for the SO (both for testing and updating modelling of the units) 2) To allow asset owner time to organise test engineers to test the asset, noting there are few test engineers available in New Zealand.

FSR-001: Remove the exclusion for wind-powered generation from periodic testing	
Q1.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.	Yes, we agree. The alternative option in the consultation paper is a guideline, with no Code amendment, which would not meet the objectives given for the proposed Code amendment.
Q1.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?	Yes.

FSR-002: Clarify that embedded generators must provide an asset capability statement in a format specified by the system operator	
Q2.1. Do you support the Authority's proposal to amend the Code to clarify that: (a) embedded generators must provide asset capability statement information to the system operator in the form from time to time published by the system operator, and (b) the requirement to provide an asset capability statement to the system operator applies only to generators with a generating unit with rated net maximum capacity equal to or greater than 1MW?	Yes.
Q2.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.	No.
Q2.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.	No comment, as there is no alternative option given.
Q2.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?	Yes.

<p>FSR-003: Include distributors and energy storage systems as potential causers of under-frequency events</p>	
<p>Q3.1. Do you support the Authority's proposal to amend the definition of 'causer' in clause 1.1 of the Code so that it refers to the action that results in a UFE, including an increase in electricity demand (load), and the consequential amendments to clauses 8.60 to 8.66, including proposed new clause 8.64A?</p> <p>under-frequency event means—</p> <p>(a) an interruption or reduction of electricity injected into the grid; or</p> <p>(b) an interruption or reduction of electricity injected from the HVDC link into the South Island HVDC injection point or the North Island HVDC injection point,</p> <p>if there is, within any 60 second period, an aggregate loss of injection of electricity in excess of 60 MW...</p>	<p>Yes.</p>
<p>Q3.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.</p>	<p>No comment.</p>
<p>Q3.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.</p>	<p>Yes. The other two options would require significant work to implement.</p>
<p>Q3.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?</p>	<p>Yes.</p>

<p>FSR-004: Amend the requirement to have a speed governor</p>	
<p>Q4.1. Do you support the Authority's proposal to amend clause 1.1 of the Code, and clauses 3, 4</p>	<p>Yes. This proposal will reduce the number of requests for equivalences.</p>

<p>FSR-004: Amend the requirement to have a speed governor</p>	
<p>and 5 of Appendix B of Technical Code A of Schedule 8.3, to broaden them to apply to inverter-based generation technologies</p> <p>[The term 'speed governor' is technology specific and generally refers to synchronous generating machines. Generating units that use inverters when functioning may not have speed governors, relying instead on other means by which to regulate frequency]</p>	
<p>Q4.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.</p>	<p>No comment.</p>
<p>Q4.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.</p>	<p>Yes.</p>
<p>Q4.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?</p>	<p>Yes. This proposal should remove administrative costs currently faced by the SO and generators with IBR in applying for equivalences.</p>

<p>FSR-005: Amend the requirement to have an excitation system</p>	
<p>Q5.1. Do you support the Authority's proposal to amend the Code to replace the requirement for an excitation system with a requirement for a voltage control system, to encompass all generating technologies? Please explain your answers.</p> <p>[The requirement for an excitation system specifically refers to synchronous machines and</p>	<p>Yes. This proposal will reduce the number of requests for equivalences.</p>

FSR-005: Amend the requirement to have an excitation system	
is not applicable to electricity generation that uses inverters. Inverter-based generation does not have excitation systems but instead has other systems in place to control voltage.]	
Q5.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.	No.
Q5.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.	Yes.
Q5.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?	Yes. This should remove administrative costs currently faced by the SO and generators with inverter-based resources, in applying for equivalences.

FSR-006: Amend the Code to apply to all dynamic reactive power compensation devices	[SO and GO view]
Q6.1. Do you support the Authority's proposal to amend the Code to require all dynamic reactive power compensation devices to undergo periodic testing?	Yes, with the changes proposed applying to clause 9 only.
Q6.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.	Not if the change is to clause 9 only, to retain existing test settings for other devices specified in Appendix B (e.g. synchronous compensator under clause 11).
Q6.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why	Yes.

FSR-006: Amend the Code to apply to all dynamic reactive power compensation devices	[SO and GO view]
and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.	
Q6.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?	Yes.

FSR-007: Treat energy storage systems as only generation for the purposes of Part 8	
Q7.1. Do you support the Authority's proposal to amend the Code to treat ESSs as generation for the purposes of Part 8?	<p>Yes.</p> <p>The proposal should include ESS obligations at 0 MW and 0 MVAR (standby mode). This matches generators' obligations and will remove uncertainty on obligations when operating in the standby mode. Clarity on obligations when transitioning in and out of standby mode will support the SO to configure the online operational tools to accurately model the ESS capability and monitoring compliance.</p> <p>ESS is a versatile piece of technology which can operate in charging and discharging mode. ESS can also operate at 0 MW in standby mode to be ready to provide instantaneous reserve during an under-frequency event.</p> <p>The proposed Code amendment is to address the ambiguity when the ESS is operating in the charging mode. The proposal removes the need for ESS to provide AUFLS when operated in charging mode giving the ESS full capability to provide paid ancillary services. We support this.</p> <p>The proposed amendment requires ESS to comply with the obligations that apply to a generator or embedded generator, regardless</p>

<p>FSR-007: Treat energy storage systems as only generation for the purposes of Part 8</p>	
	<p>of whether the ESS is discharging or charging. The proposal is silent on the obligations when the ESS is operated in standby mode or at 0 MW and 0 Mvar. This creates another ambiguity that will create uncertain in apply obligations to ESS when operating in the standby mode. This inconsistency in obligations when transitioning in and out of standby mode will make it difficult for SO to configure the online operational tools to accurately model the ESS capability and monitoring compliance.</p> <p>We strongly urge the Authority to make it clear the obligations of the ESS under all possible operating modes. This encourages Asset Owners to purchase equipment that can meet these obligations and allows the SO to apply correct and accurate compliance assessments.</p>
<p>Q7.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.</p>	<p>We agree with the Authority that the approach should be an interim step for the ESS policy, for clarifying Part 8 obligations on large BESS > 30MW.</p> <p>ESS technology is just coming into New Zealand grid system and this technology is very flexible, configurable and fast in responding to system variations. We understand that this proposal is an interim solution, but the solution should not create more uncertainties, or 'bake in' obligations.</p>
<p>Q7.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.</p>	<p>Yes.</p>

FSR-007: Treat energy storage systems as only generation for the purposes of Part 8	
Q7.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?	Yes.

FSR-008: Clarify the definition of generating unit	
<p>Q8.1. Do you support the Authority's proposal to amend the definition of generating unit in clause 1.1 of the Code so that it refers to a generating unit having a frequency and/or voltage control system?</p> <p>[The Authority proposes the term 'generating unit' be defined in terms of its frequency and voltage control systems. This clarification would ensure that a generating unit is understood as the smallest entity that is able to produce electricity independently of other entities that are part of the same system]</p>	<p>No.</p> <p>A new definition is needed, but the proposal does not solve all the application problems we may face. To associate generating unit definition with frequency and voltage control system may not remove all the uncertainty and in our view, it will still lead to misinterpretation and inconsistent application of the Code's common quality requirements. For example, the proposed definition could treat entire wind, solar and battery farms as a single generating unit. This removes SO ability to request for indications and measurements for single inverter strings stated in Table A1 of Appendix A. To obtain this information we would have to resort to Clause 9 of Technical Code C to request for additional information under "reasonable opinion" circumstances which in our experiences, take unnecessary effort adding to our commissioning workload.</p> <p>This is more so for a hybrid plant which likely going to have one single frequency or voltage controller controlling the solar/wind and BESS components. This will create more uncertainty and ambiguity if applying this definition to a hybrid plant.</p> <p>One option is for the SO (for common quality) and GO (under part 12) to have discretion to apply the term taking into account the</p>

<p>FSR-008: Clarify the definition of generating unit</p>	
	<p>characteristics of the technology and as identified by the other option presented.</p>
<p>Q8.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.</p>	<p>For common quality needs, the new term creates further interpretation and application issues, for example, it would not recognise generating units of a wind farm configured as a string (i.e. in series). This is useful information in modelling the power system.</p> <p>The proposal does not future proof the definition. In some scenarios, the definition will limit SO the ability to request for more asset information for operational needs, reducing visibility can reduce efficiency and lead to less accuracy in modelling the plant capability.</p>
<p>Q8.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority's main statutory objective in section 15 of the Electricity Industry Act 2010.</p> <p>The proposed amendment is: generating unit means <u>the smallest set of all equipment functioning together as a single entity to produce electricity and that has its own frequency and/or voltage control systems</u></p>	<p>No. The Authority could consider an option to define generating unit in a document incorporated into the Code which could present more detail around string level units and hybrid plants, and enable future technologies to be included as they are developed. This will overcome the limitation of defining generating unit as per this proposal.</p>
<p>Q8.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?</p>	<p>No comment.</p>

<p>FSR-009: Clarify the Code’s fault ride through requirements</p>	
<p>Q9.1. Do you support the Authority’s proposal to amend the Code to allow a machine-based synchronous generating unit to be deemed compliant with the Code’s FRT requirements if full compliance is not possible.</p> <p>[Some machine-based synchronous generating units are unable to fully comply with the FRT requirements in the Code, due to their inherent characteristics. As a result, the owners of these generating units have had to apply to the system operator for a dispensation from the FRT requirements.]</p>	<p>No.</p> <p>We accept that synchronous and inverter - based generation technologies are different and may require different FRT assessment criteria. However, whilst the proposal removes the requirements and transactional costs associated with dispensations, the SO and asset owner will still need to complete assessments of FRT compliance. These assessments will involve the added ambiguity under the proposed clause, in how an asset owner can demonstrate to the SO’s satisfaction that it is not possible to fully comply and that the asset owner has taken all reasonable measures to support the stability of the grid.</p> <p>It is worth noting that there are potential mechanisms pass on costs for non-compliance under dispensations.</p> <p>We favour accelerating work to establish clear FRT criteria for synchronous generators.</p>
<p>Q9.2. Do you see any unintended consequences in making such an amendment? Please explain your answers.</p>	<p>Yes: the proposal may introduce ambiguity into the FRT assessment process as mentioned above.</p>
<p>Q9.3. Do you agree the proposed Code amendment is preferable to the other option identified? If you disagree, please explain why and give your preferred option in terms consistent with the Authority’s main statutory objective in section 15 of the Electricity Industry Act 2010.</p>	<p>No.</p> <p>The existing clause should remain, and work to develop FRT obligations for synchronous generation accelerated. The proposed option will not reduce overall transaction costs and may introduce ambiguity (and hence increased time for assessments.)</p>
<p>Q9.4. Do you agree with the analysis presented in this Regulatory Statement? If not, why not?</p>	<p>No.</p> <p>There is insufficient analysis to assess whether the proposal is an improvement on the status</p>

FSR-009: Clarify the Code's fault ride through requirements	
	quo, and that any benefits outweigh costs to justify the proposal.