

MINUTES OF CQTG MEETING 12

Held on Tuesday 24 June 2025, 1:32pm – 3:18pm
Electricity Authority office (online) – Wellington

Members present: Sheila Matthews (Chair), Graeme Ancell, Matt Copland, Brent Duder-Findlay (from 1:36pm), Barbara Elliston (from 1:49pm), Brad Henderson (until 3:13pm), Stuart MacDonald, Mike Moeahu, Jon Spiller (until 3:00pm), Gareth Williams (from 1:39pm).

Apologies: Stuart Johnston, Rob Orange.

In attendance: Phillip Beardmore, Otis Boyle, Elzeth Grant-Fargie, Katherine Moore (until 3:13pm), Chantelle Tomon, Nyuk-Min Vong (Vong), Rob Mitchell.

1. Introduction

- 1.1 The Chair welcomed attendees to the twelfth meeting of the Common Quality Technical Group (CQTG). A quorum was established, with ten of the twelve members present.
- 1.2 The purpose of this meeting was to seek feedback from the CQTG on the system operator's draft system strength report, which forms stage 1 of the Authority's system strength work.

2. System strength report

- 2.1 Chantelle presented a summary of the system strength report prepared by the system operator. Key points from the CQTG's discussion are summarised below.

Literature review

- 2.2 System strength is not adversely affected solely by grid-following (GFL) inverters. Both GFL and grid-forming (GFM) inverters can contribute to system strength issues if their control systems are not properly tuned. GFM inverters can provide beneficial grid damping, but if not configured appropriately they may interact adversely with system components such as transformers (eg, through harmonic interactions). Also, it is possible that GFL inverters could improve system strength on certain parts of a network.
- 2.3 New Zealand's context differs from many overseas jurisdictions, where inverter-based resources (IBRs) are replacing synchronous thermal generation. In contrast, New Zealand's IBRs are largely being added to a base of synchronous generation (primarily hydro generation).

- 2.4 The system operator's focus in relation to system strength issues is not on IBRs per se (low system strength can occur in the absence of IBRs), but rather on control systems. This includes static synchronous compensators (STATCOMs), which can exhibit control interactions with nearby inverters under certain conditions. It was noted that GFM capability is beginning to be incorporated in STATCOMs.

Implications for New Zealand – Proposed scope of system strength studies in Stage 2

- 2.5 The CQTG noted the relatively broad scope of the proposed system studies and the relatively large amount of effort that would be associated with this broad scope. The CQTG discussed whether outsourcing the study work might be desirable given system operator resourcing limitations. In response the system operator said it is comfortable its engineering resources have the appropriate specialist expertise support to undertake the proposed studies as well as the necessary tools. This includes a beta version of a PowerTech module to analyse modes that arise from control interactions, which the system operator has helped PowerTech to test. The system operator also noted the importance of continuing to develop its internal tools and skills to support future study capability.
- 2.6 The CQTG queried whether there is a risk of 'baking' into the system strength modelling results the models of a subset of Original Equipment Manufacturers (OEMs). The group also queried how the studies would distinguish firmware-specific issues from broader system-level issues/behaviours. It was noted that a good understanding of inverter control systems was needed, and OEMs are often the best source of this information.
- 2.7 Tool limitations were noted, such as the inability of the Small Signal Analysis Tool (SSAT) to perform frequency scanning around the operating point. The system operator proposed using Power Systems Computer Aided Design (PSCAD) to do the frequency scanning, with the data then be fed into SSAT. In future, SSAT is expected to support direct integration of models, eliminating the need for PSCAD in this process.
- 2.8 In response to a query from a member of the CQTG, the system operator noted that studying islanded operations and system protection were outside the scope of the proposed studies.
- 2.9 There was support for the system operator's technology-neutral approach, aiming to specify requirements that enable participation from all inverter types, including both GFL and GFM technologies. The system operator indicated a preference to reduce obligations where feasible. For example, consideration may be given to lowering the current short circuit ratio (SCR) threshold of 3 in certain situations.
- 2.10 Members encouraged leveraging international experience, especially from Australia, and cautioned against overcomplicating the analysis or assuming that overseas issues will necessarily apply to New Zealand's power system.
- 2.11 The CQTG emphasised the importance of keeping simple and understandable the process for determining what modelling is required for new connections to the power system. The system operator said its current thinking is that a funnelling approach for determining the modelling/study requirements for new connections could be appropriate – start with an assessment matrix, followed by eigenvalue analysis, and then PSCAD modelling if necessary. The CQTG highlighted the benefit of simplicity associated with using SCR as an initial screening tool. The

system operator agreed that getting the matrix values correct was important – eg, is it 1 or is it 3?

- 2.12 The group queried whether expert peer review of the system strength studies would be desirable, to ensure the studies remain focused and effective. The CQTG also suggested the Authority engage with the Australian Energy Market Operator (AEMO) to ask for their reports on the system strength work they have undertaken, and to gain insight into particular areas (eg, eigenvalue analysis).

Action Item 12.1: Authority to consider an external peer review on the system strength work.

3. The Authority's Future Security & Resilience work programme for 2025/26

- 3.1 The CQTG chair sought feedback from the group on the prioritisation of the system strength studies relative to other work on the Authority's Future Security and Resilience (FSR) work programme for the 2025-2026 financial year.
- 3.2 The group supported the following prioritisation of FSR work programme activities for 2025/2026, noting it addresses immediate issues first, followed by issues that are expected to emerge over time.
- 3.3 First priority items to be progressed:
- (a) Asset owner performance obligations for battery energy storage systems (BESSs) and hybrid plants
 - (b) Common quality issue 6 (information): Incorporating by reference in the Code the Connected Asset Commissioning, Testing and Information Standard (CACTIS), and then considering the sharing of information between the system operator and Transpower, as a transmission grid owner, and electricity distributors
 - (c) An omnibus of Code amendment proposals to, amongst other things, update Code terminology and definitions
 - (d) The governance of harmonics.
- 3.4 Second priority items, if the Authority has sufficient budget:
- (a) System strength (stage 2)
 - (b) Management of reactive power across grid exit points (GXPs).
- 3.5 Third priority items, if the Authority has sufficient budget:
- (a) Fault ride-through curves
 - (b) The management of harmonics, which is likely to require input from the system operator, grid owner, and distributors.

4. AOB

- 4.1 Minutes from the ninth, tenth and eleventh CQTG meetings were accepted.

Action Item 12.2: Authority to publish the minutes from CQTG meetings 9, 10 and 11.

- 4.2 Members will advise whether they agree to extend their membership for another year through to 30 June 2026 by COB, Wednesday, 25 June 2025.
- 4.3 The timing of the next meeting will depend on the submission analysis of the frequency and voltage consultations.
- 4.4 The meeting closed at 3:18pm.

Summary of outstanding action points

No.	Action	Who	Status
5.4	Authority to consider reviewing the periodic testing requirements, so that Part 8 of the Code contains high-level output-focussed obligations and specific testing requirements are placed in a separate document incorporated by reference into the Code.	Authority	Complete
5.15	Authority to consider the appropriateness of including in the Code a new definition 'generating system'.	Authority	In progress
7.2	Voltage issue: Authority to consider clarifying the terms "synchronised", and "available for dispatch" in clause 8.23 of the Code.	Authority	In progress
7.4	Voltage issue: Authority to consult distributors (likely via Electricity Networks Aotearoa (ENA)) on a $\pm 33\%$ net reactive power range for generators connected to distribution networks, explaining the reasons for this range when doing so.	Authority	In progress
7.5	Voltage issue: System operator to carry out further voltage-related studies to determine whether the GXP power factor requirements in the Code should be revised.	System operator	Complete
7.7	Voltage issue: Authority to consider submitters' concerns about the potential costs of Option 2 as part of evaluating the option's benefits and costs.	Authority	In progress

7.9	Voltage issue: Authority to add GFM as a topic to the system strength work in the FSR roadmap (item 6) in the next financial year.	Authority	Complete
7.10	Harmonic issue: Authority to raise the device standard issue with MBIE and propose removing NZECP 36:1993.	Authority	Complete
7.12	Harmonic issue: Authority to develop harmonics options 1 and 2, discuss with the harmonics sub-group, and present a draft options consultation paper to the CQTG in Q1 2025.	Authority	In progress
8.1	Authority / system operator to define “point of control” and specify the applicable transformer for routine testing of IBR in the DIBR	Authority / system operator	Complete
8.6	- Authority to clarify in the DIBR which: (i) control setting changes are considered/deemed to affect frequency control, and (ii) firmware changes are considered/deemed to affect frequency response performance.	System operator / Authority	Closed
8.7	- Authority to clarify in the DIBR which: (i) control setting changes are considered/deemed to affect voltage control, and (ii) firmware changes are considered/deemed to affect voltage response performance.	System operator / Authority	Closed
8.9	Authority to discuss internally the possibility of the NCTG looking at testing obligations on distribution-connected dynamic reactive power compensation devices. Update: The NCTG does not have the resources to do this any time soon.	Authority	Closed

	Authority to seek CQTG feedback on whether this item needs to be considered in the Part 8 review.		
8.11	Authority to elaborate (under FSR-007) that further clarification of how clauses 8.17 and 8.19 would apply to BESS will be provided in the DIBR. Update: this has been included in the BESS AOPO work rather than the DIBR	Authority	In progress
8.12	Authority to follow up on Stuart M's question regarding how aggregators with ESS should be treated under the Code's AUFLS obligations. Update: Aggregators with ESS are not directly obligated under the Code's AUFLS requirements, unless their assets are grid-connected. Distributors must account for embedded BESS when assessing compliance, similar to how they consider interruptible load providers.	Authority	Complete
9.2	Authority to consider additional work on ramp rates and droop settings for generating stations.	Authority	Complete
9.4	Transpower (as the grid owner) to provide guidance on the intent and enforcement of the current power factor requirements Update: The GO is setting up automated power factor (PF) monitoring via the metering system (data is measured at 30 min intervals). The PF requirements are across Regional Coincident Peak Demand (RCPD) periods which are the top 100 peaks in a pricing year (as defined by the Transmission Pricing Methodology (TPM)). The intention is that once we have the automated monitoring up and running, we are able to more easily	Grid owner	Complete

	identify non-compliance. Our process would entail notifying a customer if there was a compliance issue and discussing remediation options with them. We'll continue monitoring to ensure any corrective actions have resolved the compliance issue. Continued breaches would warrant notification to the Electricity Authority.		
9.6	Authority to further develop Alternative 1 for the co-ordination of reactive power flows through GXPs, to establish a bilateral information-sharing framework between the system operator and distributors.	Authority	Not started
9.7	Authority to proceed with voltage option 1, ensuring that grandfathering aligns with the approach taken for frequency proposals.	Authority	Complete
9.8	Authority to proceed with voltage option 3, ensuring alignment with other options by linking fault ride through to GXP voltage and the 10MW threshold.	Authority	Complete
9.9	Authority to clarify the definition of "idle" in relation to BESS AOPOs, and to clarify the voltage AOPOs when in standby mode.	Authority	In progress
9.10	Authority / system operator to consider adding a requirement for protection co-ordination studies into the DIBR.	Authority / system operator	Complete
10.1	Authority to add wording to the common quality information requirements consultation paper explaining why only some of the Part 8 technical codes are proposed to be moved into the DIBR.	Authority	Complete
10.2	System operator to check the timeframes in Chapter 1 of the DIBR apply to assets other than new assets, and to clarify the process in section 17.3 of the DIBR for the grid owner and connected	System operator	Complete

	parties to ensure that protection coordination has been achieved.		
10.3	System operator to draft a cover note for the DIBR, explaining the rationale for the proposed DIBR requirements and a summary of the costs and benefits.	System operator	Complete
10.4	System operator to clarify in the DIBR that generators will be required to provide the system operator with state-of-charge indications at the generating station level for IBR, along with the number of active inverters.	System operator	Complete
10.5	System operator to incorporate CQTG feedback on the draft scope of work for stage 1 of a system strength-related investigation, with this feedback including (a) clarifying the types of issues that will be considered and those that are out of scope (b) clarifying that some IBR can sustain fault levels, and (c) summarising the 6 GFM technologies, but specifically focusing on the 2 main GFM technologies. Update: The system operator considered, as follows, the CQTG's feedback on the draft scope as part of preparing the Stage 1 report: (a) Clarifying the types of issues that will be considered and those that are out of scope. <i>Chapter 7 of the Stage 1 report lists the types of issues being faced internationally, with the implications for New Zealand covered in Chapter 9. Chapter 10 covers the studies for Stage 2 and the out-of-scope items.</i> (b) Clarifying that some IBR can sustain fault levels. <i>This will be covered in Stage 2 when the studies are undertaken.</i> (c) Summarising the 6 GFM technologies, but specifically	System operator	Closed

	focusing on the 2 main GFM technologies. <i>The Stage 1 report covers the three main types of GFM technologies and does not mention the three other types since these are not widely used.</i>		
11.1	Brad to provide an estimate of inverter capital costs ($\pm 50\%$) to inform the assessment of incremental upfront costs for embedded generation under the voltage support proposal.	Brad Henderson	Complete
11.2	Authority to consider the CQTG's feedback on the voltage-related Code amendment proposal consultation paper, and incorporate feedback into the paper.	Authority	Complete
12.1	Authority to consider an external peer review on the system strength work.	Authority	
12.2	Authority to publish the minutes from CQTG meetings 9, 10 and 11.	Authority	

Confirming the CQTG has approved these meeting minutes are a true and correct record.

Dated this 4th day of March 2026



Sheila Matthews

Chair