MINUTES OF CQTG MEETING 17

Held on Wednesday 19 August 2026, 9.00 am – 4.29 pm
Electricity Authority office – Wellington

Members present:	Sheila Matthews (Chair), Hasti Adouli (online), Graeme Ancell, Gavin Bonnett (online), Matt Copland, Barbara Elliston, Brad Henderson, Stuart MacDonald, Mike Moeahu, Rob Orange, Jon Spiller, Philip Wong Too
Apologies	None
In attendance:	Nabil Adam, Natalie Bartos, Phillip Beardmore, Otis Boyle, Charlie Chrystall (online), Dave Hume (online), Stuart Johnston (online), Victor Lo (online, 9:12am-9:59am), Hamish McKinnon, Roger Miller (online), Rob Mitchell, Ivani Molver (online, 2.00pm-4.30pm), Varun Nand (online, 2:00pm-3.30pm), Joshi Snehalkumar (online, 2.00pm-4.30pm), Amelia Tan, Chantelle Tomon, Professor Neville Watson (online, 9:00am-9:59am), Orion Watson, Nyuk-Min Vong (Vong).

1. Introduction

1.1 The Chair welcomed attendees to the seventeenth meeting of the Common Quality Technical Group (CQTG). A quorum was established, with all members present.

1.2 The Chair introduced 2 new members, Hasti Adouli and Gavin Bonnett, to the CQTG who replace Stuart Johnston and Brent Duder-Findlay who resigned from the group earlier this year.

1.3 The purpose of the meeting was for CQTG members to discuss:

- the preferred approach for harmonics governance
- asset owner performance obligations (AOPOs) for battery energy storage systems (BESS's) in the 'idle' state and for BESS-hybrid plant in the 'non-idle' state
- wholesale market arrangements, in particular station dispatch options, for BESS-hybrid plant
- an update on draft requirements for large loads connected to New Zealand's power system
- analysis of future power system inertia requirements
- the System Operator's updated analysis of hybrid criteria for limiting reactive power flows at grid exit points (GXPs)

- voltage AOPOs under clause 8.23 of the Electricity Industry Participation Code 2010 (Code)
- a proposed issues and options paper about reactive power flows and voltage coordination across GXPs
- revised timelines for activities in the FSR Roadmap
- an update on the status of items that were placed on hold during the development of common quality-related Code amendments over the past two years.

2. Minutes of previous meeting

2.1 The CQTG approved the draft minutes of meeting 16 as a true and correct record for publishing.

3. Matters arising

3.1 Actions requiring discussion:

- Action 14.5: The System Operator confirmed NZ standard time is used for timestamping data, including SCADA data. This is more efficient than using another format (eg, coordinated universal time (UTC)), which would require converting the data to NZ standard time. The CQTG agreed the action is complete.
- Action 14.6: The CQTG agreed this action is complete as the Connected Asset Commissioning and Testing Standard (CACTIS) specifies that study reports required for commissioning purposes must be submitted to the System Operator as least two months prior to the asset being electrically connected to the network.

Action Item 17.1: Authority to finalise and publish minutes from CQTG meeting 16.

4. Harmonics – key points from submissions and next steps

4.1 Stuart Johnston presented an update on the Authority's harmonics governance work following consultation. He summarised the key themes from submissions, the Authority's preliminary conclusions and proposed direction, and the implementation issues requiring further consideration. The CQTG was asked to provide technical advice to inform the next stage of policy development and Code drafting.

4.2 The CQTG discussed the proposed direction and practical implementation of an updated harmonics governance framework. Key points included:

(a) the role of dispensations in managing existing installations where compliance with revised requirements may be difficult

(b) the importance of obtaining good quality harmonics data before and during the commissioning of assets, to identify and resolve potential issues

(c) IEC standards fix the compatibility level rather than the planning level, with the planning level being how to allow for the characteristics of different networks (ie, different percentage levels may be used across different networks) – a new AS/NZS standard currently being drafted is relevant to this point

(d) the need to recognise that equipment from different manufacturers may perform differently and should not necessarily be treated as equivalent

(e) the importance of considering the variability of harmonic levels over time when assessing compliance – it was noted that the IEC approach uses a statistical assessment, taking the 95th percentile value over a minimum monitoring period of one week

(f) the need to consider how compliance monitoring and enforcement will work if there is a high degree of flexibility in the harmonics requirements

(g) whether this is a need to develop a distribution network benchmark connection agreement to avoid some distribution connection agreements being overly conservative in the management of harmonics.

4.3 The CQTG agreed with proceeding with the first option proposed in the consultation on options, which is to replace NZECP 36:1993 with a modern framework based on AS/NZS 61000 and the EEA Power Quality Guidelines. The CQTG also supported further technical work to inform implementation of the proposed framework.

4.4 Members were invited to provide any additional comments to the Authority following the meeting and to participate in the existing CQTG harmonics subgroup.

Action Item 17.2: Authority to review the membership of the harmonics subgroup and consider additional representation from distributors.

5. Hybrid AOPO Code amendment proposals

5.1 Hamish McKinnon and Rob Mitchell presented on:

(a) feedback received through the Common quality and wholesale market arrangements for BESSs and BESS-hybrid stations issues and options consultation, and

(b) proposed next steps for updating the Code to accommodate BESS- hybrid plant.

5.2 The Authority sought feedback from the CQTG on the Authority's preliminary thinking before developing Code amendment proposals.

Generating asset definitions:

(a) The CQTG generally supported the proposed five-tier generating asset framework and considered it sufficiently flexible to accommodate a range of existing and emerging generation and hybrid configurations, including both AC- and DC-coupled arrangements.

(b) Members noted the importance of ensuring the framework accommodates situations where different technology components within

a hybrid station may have different owners. Consideration was also given to whether some obligations should apply at the component level rather than solely at the station level.

Non-idle state AOPOs for BESS-hybrid stations:

(c) There was general agreement that separate AOPO frameworks for AC- and DC-coupled hybrid stations do not appear necessary, although the application of obligations would need to be clearly articulated.

(d) The CQTG was generally supportive of assessing frequency and voltage AOPOs at the point of connection. For frequency AOPOs, members emphasised the need to ensure that a BESS would not be required to compensate for a co-located generation component that is operating at its maximum output.

(e) Attention was drawn to the need to avoid creating incentives that favour particular hybrid configurations or discourage co-location of BESS and generation assets.

(f) Discussion also covered the relationship between market and common quality obligations, and the circumstances in which a BESS should be expected to contribute to frequency response based only on the BESS's capacity when co-located with generation.

(g) The CQTG noted some implementation considerations around the System Operator's working interpretation of clause 8.17. That is, if a generator's assets are operating at their maximum continuous MW output power, maintaining pre-event output during an under-frequency event (UFE) is sufficient for the generator to comply with the clause 8.17 requirement.

(h) The CQTG discussed whether the System Operator would require visibility of state-of-charge information, available headroom and maximum available output for BESSs. Members noted both the potential value of this information for power system analysis and the practical challenges associated with its use.

Idle-state AOPOs for BESSs and BESS-hybrid stations:

(i) The CQTG discussed the proposed definition of "idle" and possible idle-state frequency and voltage obligations.

(j) It was noted that routinely opening and closing circuit breakers to move between idle and non-idle operating states could create operational issues, including equipment wear and tear, moisture build up in the inverters, and inverters failing to fire due to a communications issue between the power plant controller and the inverter.

(k) Consideration was given to whether a reduced set of obligations, such as a "do no harm" approach, may be appropriate when a BESS remains electrically connected but is not actively providing energy or ancillary services. Any idle-state obligations should be informed by the minimum services the System Operator requires from connected assets to maintain power system security.

(l) The CQTG also discussed whether voltage support from electrically connected inverter-based resources should be procured where required, rather than relying on mandatory obligations. Some members considered that, in some circumstances, it may be more efficient for the grid owner to procure reactive power support from connected inverter-based resources that remain energised than to invest in additional reactive power support equipment.

(m) The CQTG broadly supported an "idle" definition based on an electrically connected asset that is not cleared for dispatch and which is not exporting or importing reactive power, with the definition expanded to recognise auxiliary load. However, there were differing views on whether "offered" or "cleared" should be used as the relevant market status.

Wholesale market arrangements:

(n) The CQTG discussed possible wholesale market arrangements for BESS-hybrid stations, including component level offering, station dispatch arrangements and treatment of inverter constraints.

(o) The CQTG supported providing asset owners flexibility in how BESS-hybrid plant responds to changes in available resource, provided they remain within their offer bands and do not create opportunities to game market outcomes.

Action Item	**17.3: Authority to incorporate feedback from the CQTG on the BESS-hybrids Code amendment workstream and circulate updated material to the CQTG for review.**

6. System Operator update on large loads

6.1 Phillip Beardmore introduced this agenda item, and Nabil Adam presented an update on the System Operator's work to develop technical requirements for large loads, including performance requirements, and arrangements for modelling, testing, data recording and SCADA monitoring.

6.2 The CQTG discussed the increasing number of proposed large load connections, particularly data centres.

(a) It was noted that large load configurations are evolving and that requirements should accommodate arrangements involving BESSs and other technologies. The group also recognised that some large loads may be capable of providing flexibility, firming, or other power system benefits.

(b) Consideration was given to whether future large load arrangements should recognise or encourage these capabilities. The CQTG noted that some jurisdictions are increasingly expecting large loads, particularly data centres, to provide flexibility or bring their own generation / 'firming' capability.

(c) Discussion also covered proposed performance requirements, including fault ride-through capability and the treatment of BESS-hybrid large

loads. The CQTG noted the System Operator is continuing to develop its approach as operational experience with these types of loads emerges.

(d) Members noted that testing and modelling requirements in particular will require further development. Particular attention was given to the practical challenges of testing large loads and validating load models, given the limited operational experience currently available.

(e) The CQTG also discussed the importance of coordinating modelling requirements between the System Operator and Transpower's grid owner function. Enhanced monitoring, including the potential use of phasor measurement units (PMUs), was identified as a means of supporting model validation and improving understanding of large load behaviour.

(f) The System Operator advised that guidance on technical requirements for large loads is expected to be published in Q4 2026.

Action Item 17.4: System Operator to publish guidance on large loads in Q4 2026.

7. System Operator update on system inertia needs analysis

7.1 Chantelle Tomon presented an update on the System Operator's inertia needs analysis and outlined preliminary findings on the increasing frequency of low-inertia conditions under future power system scenarios.

7.2 The CQTG discussed the System Operator's current approach to managing low-inertia conditions and the implications of the analysis for future frequency management arrangements.

(a) It was noted that low-inertia risks are currently managed through a range of operational tools, including risk management and reserve procurement arrangements, rather than through the procurement of inertia itself. Members noted that the analysis will help inform the Authority's broader frequency strategy work.

(b) Consideration was given to potential longer-term approaches to managing inertia, including international examples. Discussion included approaches used in Australia, such as synchronous condensers and arrangements to maintain generation online to provide inertia during low-demand periods.

(c) Several members noted that future work should consider the relative costs and benefits of potential inertia solutions and their impact on market outcomes.

(d) Discussion also covered the relationship between inertia and other frequency-related solutions, including fast-acting reserves, synthetic inertia, and other emerging technologies.

Action Item 17.5: Authority to consider the CQTG's feedback on inertia as part of the development of the frequency strategy work programme.

8. System Operator update on GXP reactive power criteria

8.1 Orion Watson presented on the System Operator's updated analysis of hybrid criteria for limiting reactive power flows at GXPs.

8.2 The CQTG discussed the analysis and its implications for future voltage management arrangements.

(a) It was noted that increasing amounts of embedded/distributed generation may affect reactive power flows at GXPs and distributor compliance with existing requirements. Members suggested that additional distributor data may be required to better understand emerging trends and future network behaviour.

(b) The CQTG discussed the potential overlap between any future System Operator requirements and the requirements in the Default Transmission Agreement (DTA). Members generally preferred a single, consistent framework rather than overlapping requirements.

(c) Attention was drawn to the importance of clearly identifying the underlying power system issue before considering changes to reactive power criteria. Members noted that future work should consider both transmission- and distribution-driven voltage issues and their contribution to reactive power flows at GXPs.

(d) The CQTG agreed that:

(i) no further analysis was required at this stage and that the findings should be considered alongside the Authority's ongoing work on reactive power flows and voltage coordination before determining any next steps

(ii) additional modelling should be deferred unless there is a decision to progress towards mandatory requirements.

9. Update on Clause 8.23

9.1 Phillip Beardmore presented an update on the ongoing review of voltage support obligations under clause 8.23 of the Code, including feedback received on possible changes to the point of compliance and reactive power contribution requirements.

9.2 The CQTG discussed the proposed changes and implementation considerations.

(a) There was support for moving away from measuring compliance at generating unit terminals. During the discussion, the Authority noted that the primary issue is the current point of compliance, rather than whether measurement occurs on the high-voltage or low-voltage side of the generating station transformer.

(b) Consideration was given to possible thresholds for applying different reactive power requirements (ie, ±39.5% and ±33%). Some members considered that a threshold of 66kV may be more appropriate than

110kV, particularly for parts of the power system where higher impedance can limit the effectiveness of reactive power support.

(c) Concerns were raised about the practicality of grandfathering arrangements and whether existing arrangements could be efficiently managed. Members discussed whether aspects of the System Operator's current interpretation could instead be reflected in the Code.

(d) The CQTG discussed possible changes to reactive power contribution requirements. It was noted that the existing +50%/-33% contribution requirements were largely based on the capability of synchronous generation when the obligations were originally developed. Several members considered that future settings should instead be based on the needs of the power system and should avoid creating incentives to oversize equipment solely to satisfy compliance requirements.

(e) Broad support was expressed for progressing the work and considering further analysis of potential reactive power contribution settings. Members emphasised the importance of understanding the technical justification for any revised requirements and the implications of operation at the 1.10pu voltage level.

(f) Several members noted the importance of progressing the work in a timely manner and avoiding unnecessary delays where sufficient information is already available to support decision-making.

Action Item	**17.6: Authority to discuss potential reactive power contribution settings with the System Operator, including options for differentiated requirements at different voltage levels, and consider further analysis of operation at the 1.10pu voltage level as part of the clause 8.23 work.**

10. Reactive power flows and voltage coordination across GXPs

10.1 Stuart Johnston noted this agenda item was to seek feedback from the CQTG on a proposed structure for consultation on issues and options to address reactive power flows and voltage coordination across GXPs.

10.2 Due to a lack of time, this item was deferred to the next meeting.

Action Item	**17.7: CQTG to provide feedback to the Authority on the draft document for reactive power flows and voltage coordination across GXPs.**
Action Item	**17.8: Authority to add this topic on reactive power flows and voltage coordination across GXPs to the agenda of the next CQTG meeting**.

11. Feedback on the Future Security and Resilience (FSR) roadmap update

11.1 The draft of the update to the ten-year FSR roadmap was discussed briefly.

11.2 The Authority stated that the purpose of the update was to:

(a) revise the timelines in the FSR Roadmap originally published in 2022 to reflect changes observed on the power system occurring sooner than

originally expected, and new issues identified as a result work done as part of the ongoing workstreams

(b) incorporate the DSO roadmap as the FSO workstream falls within the wider FSR programme of work.

Action Item	**17.9: CQTG members to provide feedback on the draft updated FSR roadmap**

12. Update on items in the FSR 'holding pen'

12.1 A number of options for addressing the FSR programme's seven key common quality issues have been on hold pending completion of the recently-implemented common quality Code amendments. The Authority briefly discussed these.

Action Item	**17.10 CQTG members to provide feedback on the common quality options in the holding pen.**

13. Any Other Business

13.1 Powertech, a Canadian software vendor, will be visiting the System Operator in November. The Authority sought feedback from the CQTG on whether there was interest in meeting with Powertech. There was support for organising a meeting with Powertech.

13.2 There was a brief discussion on protection requirements for transmission grid-connected projects. The group agreed this was not the right forum for this discussion.

Action Item	**17.11: Authority/System Operator to arrange a meeting between Powertech and the CQTG in November 2026.**

13.3 The next meeting of the CQTG is scheduled for Thursday, 15 October 2026.

13.4 The meeting closed at 4.29 pm.

Summary of outstanding action points

No.	Action	Who	Status
5.15	• Authority to consider the appropriateness of including in the Code a new definition 'generating system'. **Update:** This is now included in the hybrid stations/BESS AOPO work.	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
7.7	• 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
8.11	• Authority to elaborate (under FSR-007 in the first tranche of Code amendment proposals covering Issues 6 (information) and 7 (Code terminology)) that further clarification of how clauses 8.17 and 8.19 would apply to BESS will be provided in the DIBR. **Update:** This is now included in the hybrid stations/BESS AOPO work rather than the DIBR	Authority	In progress
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	In progress
9.9	• Authority to clarify the definition of "idle" in relation to BESS AOPOs, and to clarify the voltage AOPOs when in standby mode. **Update:** This is now included in the hybrid stations/BESS AOPO work.	Authority	In progress

12.1	• Authority to consider an external peer review on the system strength work.	Authority	Completed
14.4	• System operator to include in its periodic testing guidelines guidance on how high-speed data can be used for periodic testing.	System operator	In progress
14.5	• Investigate the option of a uniform standard for use in timestamping / data recording for the New Zealand power system and electricity market.	System operator	Completed
14.6	• System operator to incorporate in its commissioning guideline a recommendation that asset owners / developers submit draft studies to the system operator three months prior to the commissioning date.	System operator	Completed
14.8	• Include in Part 8 of the Code a cost recovery mechanism for the system operator to do studies and model benchmarking on behalf of asset owners.	Authority	In progress
15.2	• Authority to add to its work programme a review of the under- and over-frequency limits in the Code, considering changes expected to the power system such as large loads connecting.	Authority	In progress
15.3	• Authority to consider reviewing the obligation on generators to notify the system operator of actions they have taken when frequency rises above 50.5Hz.	Authority	Not started
15.7	• Authority to consider allowing the system operator to share dispensation information with the grid owner under stage 2 of the common quality-related information work.	Authority	In progress
16.1	• Authority to incorporate CQTG feedback in the Authority's upcoming consultation on what AOPOs might apply to a BESS that is 'idle' and to a hybrid plant.	Authority	Completed

16.2	• Authority to incorporate CQTG feedback in the Authority's upcoming consultation on revising the point of compliance under clause 8.23 of the Code.	Authority	In progress
16.5	• Authority to talk to Transpower, as a transmission grid owner, regarding the possibility of obtaining (i) a cost estimate to improve the provision of raw harmonics data; (ii) an assessment comparing current NZECP 36:1993 harmonics measurements against AS/NZS 61000 limits to identify potential costs for affected industry participants; and (iii) a harmonics 'heat map' for inclusion in the Authority's consultation paper on harmonics governance options.	Authority	Not started
16.6	• Authority to incorporate feedback from the CQTG in the Authority's consultation paper on harmonics governance options.	Authority	Completed
16.7	• Authority to ensure the FSR work plan for financial year 2026/27 is captured in the Authority's upcoming review of the FSR roadmap.	Authority	In progress
16.8	• Authority consultation on common quality information requirements (options 2 and 3) to include a section on modelling and technical requirements for large loads.	Authority	Complete
17.1	• Authority to finalise and publish minutes from meeting 16.	Authority	Complete
17.2	• Authority to review the membership of the harmonics subgroup and consider additional appropriate representation from an EDB(s)	Authority	In progress
17.3	• Authority to incorporate feedback from the CQTG on the BESS-hybrids Code amendment workstream and circulate updated material to the CQTG for review.	Authority	In progress

17.4	• System Operator to publish guidance on large loads in Q4 2026.	System operator	In progress
17.5	• Authority to consider the CQTG's feedback on inertia as part of the development of the frequency strategy work programme.	Authority	In progress
17.6	• Authority to discuss potential reactive power contribution settings with the System Operator, including options for differentiated requirements at different voltage levels, and consider further analysis of operation at the 1.10pu voltage level as part of the clause 8.23 work.	Authority	In progress
17.7	• CQTG to provide feedback to the Authority on the draft document for reactive power flows and voltage coordination across GXPs.	CQTG	In progress
17.8	• Authority to add the topic on reactive power flows and voltage coordination across GXPs to the agenda of the next CQTG meeting.	Authority	In progress
17.9	• CQTG members to provide feedback on the draft updated FSR roadmap	CQTG	In progress
17.10	• CQTG members to provide feedback on the tasks in the holding pen.	CQTG	In progress
17.11	• Authority/System operator to arrange a meeting between Powertech and the CQTG in November 2026	Authority and System operator	In progress

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

Dated this 19th day of October 2026



Sheila Matthews

Chair