

# Future Security and Resilience: Common Quality Technical Group (FSR CQTG)

Meeting 3: 03 April 2024

# AGENDA

Time	Item
8.45 am	<b>Sign in at reception (to meet Rob Mitchell)</b>
9:00 am	<b>Meeting starts - Minutes and Actions from previous meeting (15 mins)</b>
9:15 am	<b>Frequency studies – presented by Ivani</b> <ul style="list-style-type: none"> <li>Key findings and recommendations from the three frequency studies undertaken by the system operator</li> </ul>
<b>10:15 am</b>	<b>Morning tea (15 minutes)</b>
10:30 am	<b>Frequency options paper</b> <ul style="list-style-type: none"> <li>Feedback and discussion on the draft frequency options paper</li> </ul>
11:00 am	<b>Voltage studies – presented by Nuwan</b> <ul style="list-style-type: none"> <li>Key findings and recommendations from the three voltage studies undertaken by the system operator</li> </ul>
12:00 pm	<b>Voltage options paper</b> <ul style="list-style-type: none"> <li>Feedback and discussion on the draft voltage options paper</li> </ul>
<b>12:30 pm</b>	<b>Lunch (30 minutes)</b>
1:00 pm	<b>Harmonics options paper</b> <ul style="list-style-type: none"> <li>Feedback and discussion on the draft harmonics options paper</li> </ul>

Time	Item
<b>2:10 pm</b>	<b>Afternoon tea (10 mins)</b>
2:20 pm	<b>Update on status of other options in the long list of options</b> <ul style="list-style-type: none"> <li>Options being progressed in other Authority workstreams</li> <li>Options proposed to be progressed in other Authority workstreams</li> <li>Options the Authority considers should not be progressed</li> </ul>
2:55pm	<b>Next meeting (5 mins)</b>
<b>3:00 pm</b>	<b>End of meeting</b>

# OBJECTIVES

## The primary objectives of CQTG meeting #3 are:

- (a) For the CQTG to provide feedback on early drafts of consultation papers, and supporting power system studies, for options to address issues identified with:
  - Frequency
  - Voltage
  - Harmonics
- (b) For the Authority to provide the CQTG with an update on the status of options that did not get short listed

# MINUTES & ACTIONS

- Confirm the minutes from the previous meeting
- Update on the action items recorded in the minutes

# Options paper: Issue 1 (Frequency)

An increasing amount of variable and intermittent resources, primarily in the form of wind and solar PV generation, is likely to cause more frequency fluctuations, which are likely to be exacerbated over time by decreasing system inertia

## Options proposed in the paper:

- 1) Lower the 30MW threshold for generating stations to be excluded by default from complying with the frequency-related asset owner performance obligations (AOPOs) and technical codes in Part 8 of the Code
- 2) Set a permitted dead band beyond which a generating station must contribute to frequency keeping and instantaneous reserve
- 3) Procure more frequency keeping to manage frequency within the normal band (49.8–50.2Hz), and procure more instantaneous reserve to keep frequency above 48Hz for contingent events and above 47Hz (in the North Island) and 45Hz (in the South Island) for extended contingent events

## Objectives for the CQTG's discussion

- Feedback (general and specific) on early draft of consultation
- Feedback on questions
- Feedback on extent to which consultation paper draws on material from system studies
- Feedback on extent to which consultation paper should assess benefits and costs rather than asking for information from submitters

# Options paper: Issues 2, 3 and 4 (Voltage)

- An increasing amount of variable and intermittent resources, primarily in the form of wind and solar PV generation, is likely to cause greater voltage deviations, which are exacerbated by changing patterns of reactive power flows
- Increasing amounts of inverter-based variable and intermittent resources will reduce the transmission network's system strength thereby increasing the likelihood of network performance issues due to inverter-based resources disconnecting from the power system
- Over time increasingly less generation capacity is expected to be subject to fault ride through obligations in the Code, as more generating stations export less than 30MW to a network

## Options proposed in the paper:

- 1) Assign voltage support obligations to some additional parties
- 2) Manage the import and export of reactive power at a GXP
- 3) Lower the 30MW threshold for generating stations to be excluded by default from complying with the fault ride through AOPOs in clauses 8.25A and 8.25B of the Code

## Objectives for the CQTG's discussion

- Feedback (general and specific) on early draft of consultation
- Feedback on questions
- Feedback on extent to which consultation paper draws on material from system studies
- Feedback on extent to which consultation paper should assess benefits and costs rather than asking for information from submitters

# Options paper: Issue 5 (Harmonics)

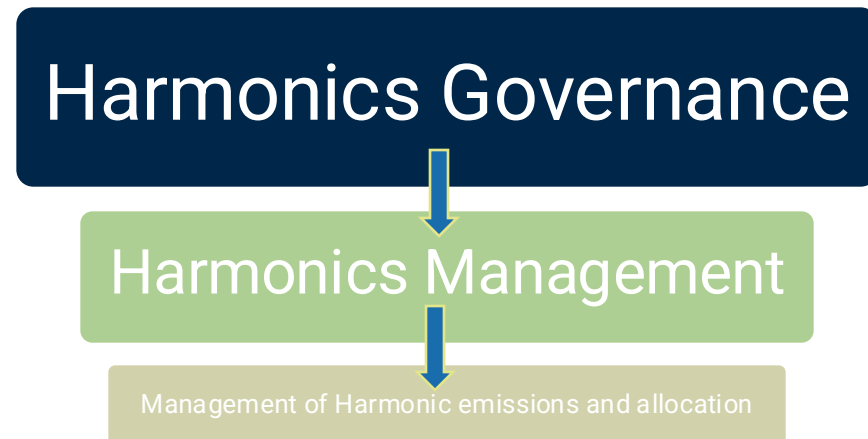
There is some ambiguity around the applicability of harmonics standards and who manages harmonics (including the allocation of harmonics)

## Options proposed in the paper:

- 1) Locate up-to-date standard(s) for harmonics in one piece of legislation/regulation
- 2) Remove the first-mover advantage associated with total harmonic distortion (THD) by requiring the first mover to give up some of their share of THD

## Objectives for the CQTG's discussion

- Feedback on pivoting from ECP36:1993 to IEC 61000 series of standards/TR as the overarching governance framework
- Feedback on regulating (including via the Code) the governance and management of harmonics
- Feedback on the Authority's stewardship in facilitating nationally consistent harmonic allocation / mitigation approach principles



## Update on status of non short-listed options

- Options that may be assessed further along the Part 8 project
- Options that may be progressed in other Authority work streams
- Options the Authority considers should not be progressed



# Options that may be assessed further along the Part 8 review

Issue no.	Option description	Update on status
2, 3, 4	Revise or remove the fault ride through envelope specified in Part 8 of the Code	<p>Voltage study 3 will help inform this option.</p> <p>Unlikely to be considered further because of other options being higher priority.</p>
2, 3, 4	<p>Impose greater obligations on distributors and the system operator to maintain:</p> <ul style="list-style-type: none"> <li>- certain voltage ranges at GXP/GIPs</li> <li>- system strength at GXP/GIPs</li> </ul>	<p>Voltage ranges</p> <ul style="list-style-type: none"> <li>- this is being addressed as part of the options paper.</li> </ul> <p>System strength</p> <ul style="list-style-type: none"> <li>- propose removing this as it is difficult to impose such obligations on NZ's power system.</li> </ul>
2, 3, 4	<p>Consider a standard for generation assets to ride through multiple faults in quick succession (within several minutes). For example, in Australia they recommend a capability of 1.8 p.u.s (i.e. the generator can dissipate full power output for 1.8 s). If a system fault is typically cleared in 200 ms, then the generator would tolerate approximately 9 successive bolted faults, before the power dissipation capability would be exceeded.</p>	<p>Propose this continues to remain on hold. In the NZ context, given the amount of synchronous generation, this is considered a HILP at this stage. Currently the SO manages connection requests in a bespoke manner, ie, if the connection request is closer to the HVDC link, the requester is provided with the HVDC commutation failure curve for their connection studies.</p> <p>(As at 8 December 2023, the Authority decided to defer analysing this option for the time being. This was for two reasons:</p> <ol style="list-style-type: none"> <li>1. because of the system operator's practice of including credible contingencies in the connection studies for proposed new connections, with the modelling of faults that have the potential to cause a multiple fault event</li> <li>2. resourcing constraints within the Authority.)</li> </ol>
2, 3, 4	Develop suitable technical requirements for fault ride through for embedded / distributed generation, which are consistent with and elaborate upon the fault ride through requirements in the Code.	<p>Voltage study 3 will help inform this option. May be considered for 2024-25.</p> <p>CQTG has recommended the Authority commence a project on this in the next financial year, with involvement of Authority, system operator, ENA and EEA.</p>

# Options that may be assessed as part of a different project: (Operations Policy team – 1 of 2)

Issue no.	Option description	Update on status
1	Resources (eg, generators, batteries) must make available X% of maximum rated capacity to support frequency in underfrequency events	May be investigated as part of the Ancillary Services (frequency keeping) Review. Initial investigations/scoping around frequency regulation has commenced. Next stage of this work is subject to prioritisation for 2024/25.
1	New market product – 1 second reserve / <b>synthetic</b> inertia	May be investigated as part of the Ancillary Services (frequency keeping) Review. Initial investigations/scoping around frequency regulation has commenced. Next stage of this work is subject to prioritisation for 2024/25.
1	Widen the normal band	May be investigated as part of the Ancillary Services (frequency keeping) Review. Initial investigations/scoping around frequency regulation has commenced. Next stage of this work is subject to prioritisation for 2024/25.
1	Have a new ancillary service for <b>inertia</b> (NB: differs slightly from the option above that relates only to synthetic inertia)	May be investigated as part of the Ancillary Services (frequency keeping) Review. Initial investigations/scoping around frequency regulation has commenced. Next stage of this work is subject to prioritisation for 2024/25.

# Options that may be assessed as part of a different project: (Operations Policy team – 2 of 2)

Issue no.	Option description	Update on status
1	Lower the minimum frequency keeping threshold below 4 MW and have a national market for frequency keeping	To be investigated as part of the Ancillary Services (frequency keeping) Review. Initial investigations/scoping around frequency regulation has commenced. Next stage of this work is subject to prioritisation for 2024/25.
1	Allocate frequency keeping costs to the causers of frequency deviations	To be investigated as part of the Ancillary Services (frequency keeping) Review. Initial investigations/scoping around frequency regulation has commenced. Next stage of this work is subject to prioritisation for 2024/25.
1	Put in place ramping limits on generation plant and load for post-disturbance or change-of-MW output (eg, due to wind gust or cloud covering)	May be investigated as part of the Ancillary Services (frequency keeping) Review. Initial investigations/scoping around frequency regulation has commenced. Next stage of this work is subject to prioritisation for 2024/25.
1	Remove the obligation on the system operator to eliminate from the power system any deviations from New Zealand standard time caused by variations in system frequency	Work is underway. Consultation paper due Q3 2024.
1	Review the dispensations and equivalence arrangements framework (for <b>frequency</b> obligations)	To be prioritised for 2025/26
2, 3, 4	Review the dispensations and equivalence arrangements framework (for <b>voltage</b> obligations)	To be prioritised for 2025/26

# Options that may be assessed as part of a different project: (Retail & Networks team)

Issue no.	Option description	Update on status
2, 3, 4	Require alignment of voltage-related connection standards across distribution networks	<p>Connection and operation standards (COPS) will be considered during Stage Two of the Network Connections project, commencing in early 2025. The work has not been scoped but is likely to include, for example:</p> <ul style="list-style-type: none"> <li>• whether COPS should be better cemented in the Code (eg, COPS are not current defined, does the Code give distributors the necessary powers to enforce)?</li> <li>• whether minimum quality thresholds should apply (eg, coverage)?</li> <li>• mechanisms to provide greater COPS consistency across networks (eg, whether certain requirements should be mandatory)</li> <li>• how industry could assist to improve compliance with COPS (eg, guidelines).</li> </ul> <p>The Network Connections Technical Group (NCTG) is assisting the Authority with this and wider Part 6 work. Input from the CQTG on COPS would be valued.</p>
6	Establish a protocol for setting the frequency in islanded networks, including who the grid forming generator is	Not previously considered but this could be added to work on COPS above.
6	Establish a registry of distributed energy resources	Work underway by Retail & Networks policy team in the Authority. First stage involves capturing more granular DG data on the ICP registry, with consultation to be released mid-2024. Second stage will look to include DER (eg, EV chargers), with consultation likely around late 2024.

# Options proposed to be removed from Part 8 review (1 of 2):

Issue no.	Option description	Update on status
1	Increase, from 45 Hz to 47 Hz, the minimum frequency at which South Island generation assets must remain synchronised for 30 seconds following an underfrequency event	<p>This is highly unlikely to be justifiable for the long-term benefit of consumers and is therefore being removed from option list.</p> <p>Note: This option, if considered, would have effects in other areas such as AUFLS, implementation on reserves etc.</p>
2, 3, 4	Establish a new ancillary service for reactive power management	Current ancillary services address this option.
2, 3, 4	Establish a new system strength ancillary service	This option would be difficult to implement on NZ's power system.
5	Make the system operator responsible for managing harmonics on the transmission network (eg, a new PPO) and distribution network operators responsible for managing harmonics on distribution networks, with costs recovered from the causers of the harmonics	The CQTG has agreed the obligation should stay with the asset owner rather than with operators.

# Options proposed to be removed from Part 8 review (2 of 2):

Issue no.	Option description	Update on status
6	Where a flexibility provider is providing a service to an asset owner, leave it to the flexibility provider rather than the asset owner to provide the network operator with the information required by the network operator to use the flexibility service	CQTG agreed this should be a contractual matter.
6	Require asset owners' vendors to provide asset capability information that network operators require to meet their regulatory obligations	This option would require vendors to be made industry participants, which would require legislative change. Would be high risk of unintended consequences - with vendors asking why they have to be a participant in order for them to provide information that the asset owner could provide. Also, the vendor's involvement with a network-connected asset typically is not for the life of the asset.
6	Require asset owners' vendors to provide asset capability information, encrypted if required by the vendor, that network owners require to optimise their network investments	This option would require vendors to be made industry participants, which would require legislative change. Would be high risk of unintended consequences - with vendors asking why they have to be a participant in order for them to provide information that the asset owner could provide. Also, the vendor's involvement with a network-connected asset typically is not for the life of the asset.

## Next meeting

**Purpose:** Review of draft consultation material on options to address Issue 6 (information requirements) and Issue 7 (Code terminology)

**Proposed next meeting date:** June 2024 (likely second half of June)

**Location:** Wellington

**ELECTRICITY  
AUTHORITY**  
TE MANA HIKO



**NGĀ MIHI**