



30 May 2023

## Issues Paper – Review of common quality requirements in Part 8 of the Code

Electra Limited (Electra) welcomes the opportunity to provide feedback to the Electricity Authority on its *Future Security and Resilience - Review of common quality requirements in Part 8 of the Code, Issues Paper*, 4 April 2023 (the Issues Paper). The views expressed in this feedback are not confidential.

We believe there is a real risk that New Zealand will make the mistakes of other jurisdictions, including Australia and California, USA, which has seen instability at the grid and distribution levels and widespread blackouts for common quality issues arising from emerging renewables decentralising generation. It is appropriate that Part 8 of the Code address risks to resilience by addressing common quality requirements at grid and distribution levels of the electricity supply chain. In Table 1, we have included our answers to the questions asked by the Authority in its Issues Paper.

**Table 1: Electra's answers to the specific questions asked in the Issues Paper**

### Issue 1: Inverter-based resources cause more frequency fluctuations.

Q1. Do you agree with the description of the first common quality issue and that addressing it should be a high priority? If you disagree, please provide your reasons.

We agree with the Authority's description of the first common quality issue. However, we do not agree that addressing it should be a high priority. The Authority should first focus on other higher-priority issues, namely common quality issues 3 and 7.

When the Authority does consider this issue, we would encourage the Authority to expand its remit as the discussion in the Issues Paper, in our opinion, is too narrow. The Authority's discussion of the issue is directed more at the System Operator and current generators than at distributors. Accordingly, it is unclear if the Authority is considering changes to the Code to consider injections lower than 30MW and the common quality issues that might arise from smaller generation. Or what the considerations for these lower levels of injection might be. We are concerned that the risk of frequency fluctuations at the lower injection levels could be overlooked to the long-term detriment of consumers.

### Issues 2, 3, and 4: Inverter based resources cause more voltage issues.

Q2. Do you agree with the description of the second common quality issue (ie, the first voltage-related issue) and that addressing it should be a high priority? If you disagree, please provide your reasons.

We agree with the Authority's description of the second common quality issue. However, prioritising this issue may not be the best allocation of the Authority's resources.

The Authority has already reviewed inverter issues causing more voltage issues. For example, the case study in Appendix A of the Issues Paper shows the difference between GXP's Islington and Kopu. Islington has installed static voltage compensators (SVCs), enabling the System Operator to manage the voltage at the GXP within a consistent range between 1.0-1.03pu. In contrast, at Kopu, where no reactive power or voltage regulation has been installed, the voltage range is between 0.99 to 1.05pu.

Similarly, global case studies have demonstrated the benefits of flexible AC transmission systems (FACTS) in regulating reactive power and voltage.

These existing studies make it less important that the Authority conduct further studies to inform the issues arising from inverter-based resources.

Further, from our perspective, the 'issue' is adequately managed on the distribution networks as the Code enables distributors to manage voltage created by distributed generation through our connection and operation standard.

Accordingly, the Authority may wish to consider whether its finite resources might be better utilised elsewhere.

Q3. Do you agree with the description of the third common quality issue (ie, second voltage-related issue) and that addressing it should be a high priority? If you disagree, please provide your reasons.

We agree with the Authority's description of the third common quality issue and that addressing it should be a priority.

With the uptake of inverter-based technology, we feel that the risk of widespread brownouts or even blackouts could be a very real issue as the state of California in the USA has experienced due to over-reliance on inverter-based resources, partly because of the hard-coded mechanism that protects the inverter and the efficient balance of instantaneous system reserve.

Q4. Do you agree with the description of the fourth common quality issue (ie, third voltage-related issue) and that addressing it should be a high priority? If you disagree, please provide your reasons.

We agree with the Authority's description of the fourth common quality issue. However, we do not see this as an immediate priority from a distribution perspective.

The size of the distributed generation over the next ten years is small, and the impact will be much smaller. The grid may compensate for it in comparison to larger dedicated generators.

### Issue 5: There is some ambiguity around harmonics standards.

Q5. Do you agree with the description of the fifth common quality issue and that addressing it should be a high priority? If you disagree, please provide your reasons.

We agree with the Authority's description of the fifth common quality issue and that it should be prioritised.

Clarity on the harmonic standards will aid in the robustness of the common quality requirements as uptake of inverter-based resources increases over the next five to 10 years; an earlier intervention is better than a later one.

**Issue 6: Network operators have insufficient information on assets wanting to connect, which are connected, to the power system.**

**Q6. If you are a distributor, what is your experience of asset owners sharing information with you for network operation purposes?**

We are generally the 'last to know' about distributed generation connected or wanting to connect to our network. This reality arises for several reasons. Small connections, i.e., less than 10kW on domestic connections, are part of the building contract. So we only become aware of the connection when the new connection application is submitted to us. For large connections, i.e., more than 1MW, we tend to be made aware before the building starts. Still, the location and specifications tend to be 'commercial in confidence', and we know very little until we enter a non-disclosure agreement with the asset owner. Even then, the asset owner can be reluctant to release 'too much information' and often only do so on a 'need to know' basis.

We do not view these circumstances as a problem for the Authority to solve but rather a reality of operations that the Authority should be aware of.

**Q7. Do you agree with the description of the sixth common quality issue and that addressing it should be a high priority? If you disagree, please provide your reasons.**

We agree with the Authority's description of the sixth common quality issue and that it should be prioritised.

Asset information is a part of good asset management, particularly configuration management, where additional asset information is a standard requirement. Standardising this will help from a robust common quality requirement because of reasons articulated in paragraph 6.4 of the Issues Paper.

**Issue 7: Code terms missing or not fit for purpose**

**Q8. Do you agree with the description of the seventh common quality issue and that addressing it should be a high priority? If you disagree, please provide your reasons.**

We agree with the Authority's description of the seventh common quality issue and that it should be prioritised.

It is appropriate that the Code be amended to fit the landscape of inverter-based resources and that terms be revised or added to allow for the future grid.

**Q9. Do you consider there to be other high priority common quality issues not identified in this paper that are occurring or that you expect to occur because of:**

- a. the uptake of inverter-based resources, and/or
- b. how the Code enables different technologies?

We have no further comment on Q9(a).

In answering question 9(b), we believe the Code's technology-neutral language makes it ambiguous whether the Code explicitly does or does not enable different technologies, including frequency keeping. To answer this question, we can draw on the intent of 'reasonable and prudent operating practice, in relation to distributed generation' as defined in Part 1 of the Code, which includes—

- (a) the industry operating standards; and
- (b) measures to avoid the injection of electricity from distributed generation that—
  - (i) exceeds the distribution network capacity at the point of injection; or
  - (ii) results in a significant adverse effect on voltage levels; or
  - (iii) results in a significant adverse effect on the quality and reliability of electricity conveyed to other users of the distribution network; and
- (c) the use or proposed use of reasonable and prudent measures to enable the connection of distributed generation.

Industry operating standards naturally evolve as new and 'different' technologies become available, though, at times, this may not be the fastest adoption for various reasons. Accordingly, we believe that the Code does enable different technologies though that facilitation may not be explicit.

We trust that the Authority finds our submission helpful in understanding and addressing the security and resilience challenges by reviewing the common quality requirements in Part 8 of the Code. Please do not hesitate to contact me to discuss our views further.

Yours sincerely



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