Aurora Energy's submission

Future Security and Resilience – Review of common quality requirements in the Code

20 August 2024

1. Introduction

1. Aurora Energy Limited (Aurora Energy) welcomes the opportunity to submit its views on the Electricity Authority's "Review of common quality requirements in the Code" consultation papers.
2. Our submission focuses on the frequency and voltage issues in papers one and two of the consultation.
3. No part of our submission is confidential.

2. General comment

4. Aurora Energy agrees that Distribution Generation (DG) can assist to alleviate network constraints, but also that small scale DGs in aggregation can adversely impact quality on the distribution network and potentially the transmission network as the aggregated capacity increases.
5. In order to understand the impact DGs have on an Electricity Distribution Businesses (EDB) network, the EDB needs visibility of data at the ICP level, ideally obtained through the use of smart meters that provide close to real time data. Currently, not all EDBs have access to ICP level data in either historic or real-time form, and not all meters are smart meters. Therefore, investment would be needed by those EDBs to obtain the data and the tools required.

3. Frequency and voltage issues

6. With less inertia, it is conceivable that wider momentary interruptions may become more regular. As noted in the Authority's paper addressing frequency variability, greater frequency variability can result in sub-optimal operation of appliances and machinery connected to the grid. As well as potentially imposing greater economic costs on consumers, this could have additional implications for specific industries. For example, wider momentary fluctuations would impact industries with some continuous processes like paper winding or steel rolling. If the deviations become more common, then industry may become frustrated.
7. System frequency is slowed when faults occur on the grid or distribution networks. AS/NZS 4777.2 standard requires a six second fault ride through, that is, that a generating unit remain electrically connected to the network and operate in a stable manner during a transient voltage disturbance on the network, for six seconds.
8. The Electricity (Safety) Regulations 2010 require earth faults to be cleared in five seconds. If asset owners were obliged to clear faults in areas where greater than for example 150 MVA fault level is yielded, in minimum time (e.g., 5 cycles/ 100 ms), this would reduce the length of some of the events generation have to respond to. Once the generation inertia is lowered, it would be beneficial to have quick protection response to significant faults.

9. Most of the upper-level electricity network assets are likely to have unit type protection or distance protection already installed. Therefore, the focus could be on obtaining total coverage of instantaneous overcurrent protection to feeders connected to buses with a significant fault level.

10. Auto reclose initiation should be blocked from unit/distance protection or instantaneous overcurrent trippings. This would save a subsequent heavy fault application to the network. This will be particularly important during daylight hours in the middle of summer when electricity demand is relatively low, and smaller-scale solar generation with a zero or negligible marginal operating cost is likely to displace higher cost grid connected generation (e.g., thermal and, at times, hydro) in the dispatch schedule, as noted in the Authority's paper "Addressing larger voltage deviations and network performance issues in New Zealand's power system".

11. Blocking auto reclose initiation from unit/distance protection or instantaneous overcurrent tripping, would also help address the issues raised in paragraph 2.27 of the paper concerning faults on the transmission network that cause large voltage dips on that part of the system near to the fault location.