Submissions
Electricity Authority
Via email: battery@ea.govt.nz

6 May 2021

Battery energy storage systems offering instantaneous reserve

Thank you for the opportunity to provide feedback on the Authority's proposal to amend the Code to enable grid-scale battery energy storage systems (BESSs) to participate in the instantaneous reserve market. No part of our submission is confidential.

Mercury welcomes the proposals contained in the consultation paper. We believe these Code changes are overdue. Mercury proactively engaged with the Authority and Transpower in late 2017, approximately twelve months ahead of our 2018 commissioning date for a 1 MW prototype grid-connected BESS at Southdown in Auckland. Our project signalled the need to update the Code and the affected market systems to enable the full capacity of BESS technology to be utilised in the energy and reserves markets. The wait between late 2017 and generation reserves from batteries going live in April 2022 as proposed is regrettable for an industry that is experiencing increasing technological change more generally. Come April 2022, we estimate that the delay will have cost Mercury $280,000 in lost reserve revenues.

We are concerned that while Meridian and Contact's 100 MW project was a key motivator for the current Code amendment work, there are potentially smaller scale investments and innovations that have been delayed or shelved due to the protracted process involved in obtaining a Code amendment. Mercury considers that there is a wider issue of a general lack of flexibility to trial "non-Code compliant" solutions that have potential benefits across the market.

We agree with the Authority's assessment that further changes that enable secure operational control and dispatch of aggregated distributed energy resources will require development of necessary protocols. These future changes are likely to be justifiable after the System Operator gains operational experience with BESSs and as levels of new technology penetration increase. This is an example of another technological development (among others) that the industry needs to be able to harness for market efficiency, the long-term benefit of consumers, and meeting Aotearoa's decarbonisation goals.

One way to proactively prepare for and reduce the barriers to the roll out of new technologies whilst also managing any downside risk would be to create a more flexible exemption or regulatory "sandbox" facility in the Code to allow new technologies to be trialled on a small scale while more lasting Code changes are developed in tandem. Mercury urges the Authority to develop this facility as a priority as part of the more wide-ranging review that forms the second part of the battery storage review work programme.

In terms of specific comments on the Code amendment drafting, the amendment doesn't appear to contemplate the ability for a battery to, in essence, provide "double reserves" when charging. For example, a battery with a 1 MW inverter capacity when charging at full capacity could offer 1 MW of Interruptible Load and 1 MW of generation reserve. Therefore, when an event occurs on the grid, the battery would stop charging and then transition rapidly to injection at 1MW.

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The Code amendment also does not comment on the ability for a BESS to offer all possible products simultaneously and for market dispatch to co-optimise them. Currently a conventional generator is able to offer all available product types (energy, reserve and frequency keeping) at an offer price for any given trading period. Under this proposal, a BESS would have the following available product types: energy (charging), energy (discharging), generation reserve and interruptible load (IL). To provide efficient market outcomes it would make sense for a BESS to be able to always offer all four products at their own offer prices simultaneously. These products would then be dispatched by Transpower according to what is optimal at the time acknowledging any physical constraints (e.g.not being dispatched for discharging and interruptible load at the same time). This is not feasible at present, and a BESS operator must decide in advance whether to offer IL whilst charging or energy and/or generation reserve which can lead to inefficient outcomes in real time. This would require further updates to market systems but could lead to more efficient outcomes for the market.

Finally, Mercury is willing to work with the Authority and the System Operator to trial the implementation of this Code amendment proposal (as well as any broader initiatives concerning battery technology) on the Southdown BESS. If you wish to discuss this further or have any questions on this submission, please contact sharron.came@mercury.co.nz.

Yours sincerely

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