

6 May 2021

Electricity Authority  
Level 7, Harbour Tower  
2 Hunter Street  
Wellington 6143

Vector Limited

101 Carlton Gore Rd  
PO BOX 99882  
Auckland 1149  
New Zealand

By email: [battery@ea.govt.nz](mailto:battery@ea.govt.nz)

+64 9 978 7788 / [vector.co.nz](http://vector.co.nz)

## Response to Battery energy storage systems offering instantaneous reserve

### Introduction

- 1) This is Vector Limited's (Vector) response to the Electricity Authority's (the Authority) consultation paper, "Battery energy storage systems offering instantaneous reserve", dated 8 April 2021.
- 2) Vector agrees that the *Electricity Industry Participation Code* (the Code) should be modified such that battery energy storage systems (BESS) can participate in the instantaneous reserves markets, allowing better utilisation of this emerging technology's capabilities to deliver both fast instantaneous reserves (FIR) and sustained instantaneous reserves (SIR) in the wholesale market.
- 3) Given Transpower's recent "TPM Development Residual Charges and the Treatment of Batteries Options Consultation<sup>1</sup>", it is important that BESS that are not directly connected to the transmission grid also have equal access to the instantaneous reserve markets.
- 4) Battery assets, whether located on the grid-side of the transmission system, or on the other side of the GXP or even (aggregated) behind the meter, can provide similar benefits to the electricity system.
- 5) The System Operator's procurement plan should be used to determine the performance and monitoring requirements for instantaneous reserves and if the performance of a BESS, or aggregated BESS, is capable of being adequately evaluated by the System Operator, it should be allowed to participate in the market.

### Responses to consultation questions

**Q1:** Do you agree the issue identified by the Authority is worthy of attention?

- 6) Yes, to date, the Code-defined performance capabilities and offer requirements for instantaneous reserve reflected the characteristics of historical synchronous generating units and interruptible load and would benefit from changes that reflect more general characteristics necessary for FIR and SIR, and which can adapt to a variety of flexibility resources.

---

<sup>1</sup> <https://www.transpower.co.nz/industry/transmission-pricing-methodology-tpm/tpm-development-residual-charges-and-treatment>

**Q2:** Do you agree with the objectives of the proposed Code amendment? If not, why not?

- 7) The proposed Code amendment objective is to enable a grid-scale BESS to offer an instantaneous reserve service in the wholesale market, both when charging from and injecting into the power system.
- 8) The term “grid-scale” is not defined in the document, and is a confusing term, as the “grid” is commonly used by the Authority to refer to the transmission network owned by Transpower. Additionally, the term grid-scale is not used or defined in either the proposed Code amendment or the System Operator’s proposed procurement plan. Rather than limit the objective to grid-scale BESS, all BESS systems should be enabled to offer an instantaneous reserve service in the wholesale market.

**Q3:** Do you agree the benefits of the proposed amendment outweigh its costs?

- 9) Yes, as noted in the consultation document, the economic benefits of utilising batteries in instantaneous reserves markets has already been demonstrated internationally, and the costs associated with enabling the proposed Code changes are minimal in comparison.

**Q4:** Do you agree the proposed amendment is preferable to the other options? If you disagree, please explain your preferred option in terms consistent with the Authority’s statutory objective in section 15 of the Electricity Industry Act 2010.

- 10) Vector prefers option d) “Widening the solution to better accommodate distributed batteries”. Given that the instantaneous reserves procurement plan will now be included by reference, the Code itself should be flexible enough to allow the System Operator’s procurement plan to set the specific requirements for participation in the instantaneous reserve market. Based on the Code amendment proposed, it appears that option d) will be delivered as soon as distributed batteries are able to meet the requirements of the procurement plan.

**Q5:** Do you agree the Authority’s proposed amendment complies with section 32(1) of the Act?

- 11) The proposed amendment does comply with section 32(1) of the *Electricity Industry Act* and could promote additional competition in the electricity industry by widening the solution to better accommodate distributed batteries.

**Q6:** Do you have any comments on the drafting of the proposed Code amendment?

- 12) We suggest that the Authority consider modifying the proposed definition: “**battery energy storage** system means all equipment functioning together as a single entity that is both able to store electricity from a network and provide injection”. Having the definition in the Code require that a BESS be able to both store electricity and provide electricity injection creates a barrier for some energy storage technologies to participate in future demand flexibility markets. An example would be thermal batteries, which are a form of energy storage converting electricity to store the energy in a thermal reservoir. That thermal energy is later used to reduce or eliminate electricity use by thermal processes like refrigeration and process heat. A possible change that would make the definition more flexible for the future could be: “battery energy storage system means all equipment functioning together as a single

entity that is able to store electricity from a network, and either provide electricity injection or directly offset electricity use from the equipment integrated within the system.”

- 13) The definition of **instantaneous reserve** could be made more flexible by removing the last clause of the proposed definition: “comprising of 1 or more of the following: a) interruptible load; b) generation reserve”. This removal would focus on the objective of an instantaneous reserve service and give flexibility to the System Operator’s procurement plan to define the specific products that deliver on that objective.

- 14) The definition of **generation reserve** could be made clearer that other solutions are also welcomed if they are in accordance with the procurement plan:

Current form: “generation reserve means a form of instantaneous reserve (including partly loaded spinning reserve, tail water depressed reserve and that provided by battery energy storage systems) which comprises generating capacity that is able to provide fast instantaneous reserve or sustained instantaneous reserve in accordance with the procurement plan”

Suggested change: “generation reserve means a form of instantaneous reserve (including ***but not limited to*** partly loaded spinning reserve, ...”

- 15) In Section 13.44, “How quantity is to be specified in reserve offers”, sub bullet c) should read “quantity of demand” rather than “quantity of consumption” to better align with the proposed definition of interruptible load found earlier in the amendment: “interruptible load means a form of instantaneous reserve comprised of demand that is able to be reduced to provide fast instantaneous reserve or sustained instantaneous reserve...”.

**Q7:** Do you have any comments on the drafting of the proposed procurement plan amendment?

- 16) From the definition in B2, it appears that an ancillary services agent could represent a BESS with a single grid connection point or an aggregation of multiple battery systems that lie within a single GXP, and if they are able to meet the monitoring and performance requirements for each system, they would be allowed to participate in the markets.
- 17) Under B32.1.2.1. BESS has been explicitly excluded from participating as an interruptible load capable of load reduction within 1 second. In the case of a BESS being charged at the time of a contingency event, the BESS could stop charging in under 1 second and would otherwise be permitted to offer FIR as an interruptible load. This exclusion means that a battery offering only interruptible load (not providing any injection) would still need to follow the damping and droop requirements specified for generation reserves in section B32.1.5.
- 18) Under B32.1.2.2. BESS has been excluded from offering interruptible load as SIR. In the case that a BESS is charging at the time of a contingency event, it could stop charging and provide SIR.
- 19) Under B32.1.5 and B32.1.6, the phrase: “in the case of all equipment providing generation reserve, or battery energy storage systems providing interruptible load” could be made clearer to show that batteries can provide generation reserves as well

by amending it to: "in the case of all equipment providing generation reserve, and battery energy storage systems providing generation reserve and interruptible load".

- 20) A possibility to simplify these issues for BESS systems found in section B32 of the procurement plan, would be to have all interruptible load (including that provided by batteries) follow similar requirements and all generation (including that provided by batteries) follow similar requirements.
- 21) If each BESS can meet the performance assessment requirements described in B37 & B38, the System Operator could potentially consider aggregations of BESS if the performance data is available at an individual system basis upon request.
- 22) Under the special testing requirements for instantaneous reserve, section B45, the text should read: "For interruptible load, *except that provided by battery storage systems*". Otherwise, battery storage systems would need to follow the special testing requirements under B45 as well as those under B46A and B46B. Similarly, the statements in B47.1 and 47.2 should reflect which tests battery interruptible load must meet to be able to submit reserve offers.

## Concluding Comments

- 23) As noted in the consultation document, BESS have the potential to introduce new competitive pressure in the instantaneous reserves market and enabling participation would have a positive economic benefit.
- 24) The Authority's proposed Code amendment is a step in the direction of outcome based regulation, and as noted in our response, we believe the Authority could go further to generalise the outcomes desired from the instantaneous reserves service and allowing the procurement plan more flexibility to procure the products that deliver that service to the electricity system.
- 25) We are happy to provide further information to support this submission or discuss any aspects of it with the Authority. Please contact Neil Williams at [Neil.Williams@vector.co.nz](mailto:Neil.Williams@vector.co.nz) or 09 978 7633.
- 26) No part of this submission is confidential, and we are happy for the Authority to publish it in its entirety.

Yours sincerely



**Neil Williams**

General Manager – Market Regulation