

Submission to the Electricity Authority

Wholesale market arrangements for battery energy storage systems

Submitter	Aquila Clean Energy
Contact	Dennis Freedman, Managing Director ANZ
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Core position

Wholesale BESS reform should be treated as a security of supply and system resilience reform, not only a market efficiency reform. The Code should recognise BESS as a single flexible resource that can consume, inject and provide services, while avoiding rules that slow investment in resources that can lower consumer cost and improve reliability.

Executive summary

Aquila Clean Energy (Aquila) supports the Electricity Authority's proposed direction for wholesale market arrangements for utility scale BESS. The existing market arrangements do not adequately reflect that a BESS is a single physical resource that can consume, inject and provide system services. Updating the Code to require dispatchability while charging, align bid and offer arrangements, introduce state of charge (SoC) constraints and allow more efficient trade revisions is an important step toward unlocking BESS value for consumers.

Aquila's support is subject to five key qualifications.

1. The reforms should be treated as security of supply and system resilience reforms, not only wholesale market efficiency reforms.
2. One hour gate closure should not become the enduring design for BESS. It may be a workable interim point, but the Authority should accelerate shorter gate closure trials.
3. SoC constraints should account for round trip losses, reserve commitments, connection constraints, inverter limits and other real technical limits.
4. Constrained off payment reform should remain outside this amendment for now. Compensation for flexible resources should be reviewed holistically, including network support and non transmission value.
5. The Code drafting should avoid creating new uncertainty for BESS hybrid and DC coupled projects, which are addressed more fully in the companion common quality/hybrid paper.

Transpower's Draft Security of Supply Assessment 2026 (Draft SOSA 2026) reinforces the urgency of these reforms. The 2025 SOSA remains the latest final SOSA at the date of this draft, and Aquila recommends the Authority refresh the evidence against the final SOSA 2026 before finalising the amendment. The draft 2026 assessment identifies fragile short term national winter energy margins, North Island capacity risks during cold, dark, still winter mornings and evenings, and risks from project delays, low gas, faster demand growth and weaker renewable output. BESS reforms should be designed to help meet those risks.

Aquila's interest in the consultation

Aquila is an active renewable energy investor and developer in New Zealand. Aquila has an operational solar farm at Pukenui, has energised its Edgecumbe solar farm, and has a further New Zealand development pipeline that includes solar and wind projects. Aquila is actively considering BESS investment in New Zealand, including both DC coupled retrofits to renewable generation assets and AC coupled standalone BESS.

The proposed wholesale BESS rules will affect whether BESS can be financed, connected and operated in a way that supports the power system. Aquila therefore welcomes the Authority's work and encourages timely implementation.

Security of supply and network context

The wholesale BESS reforms should be considered together with the security of supply evidence now available from Transpower.

Draft SOSA 2026 identifies that, while the reference case may meet security standards in the short term, the result is fragile. The national winter energy margin could breach the lower standard if new projects are delayed, thermal support is reduced, demand growth is faster, gas supply is lower, or wind and solar generation output is weaker than assumed. Draft SOSA 2026 also identifies North Island

winter capacity risk during cold, dark, still mornings and evenings where wind output is low and thermal availability is limited.

That is precisely the kind of operating environment in which BESS should be valuable. However, BESS can only provide that value if it has:

1. dispatch arrangements that recognise it as a single flexible resource;
2. access to accurate and current information;
3. gate closure settings that allow it to respond to changing renewable output, demand, network constraints and SoC;
4. settlement and compensation settings that do not discourage efficient flexibility.

The SOSA also expressly does not assess intra island transmission or distribution capacity, project deliverability or commercial viability. This reinforces the need for market settings that support locational BESS value and not only national energy adequacy.

High level response to the proposed amendment

Aquila supports:

1. requiring BESS to be dispatchable while charging;
2. a single BESS bid and offer framework;
3. 10 bid price bands and 10 offer price bands;
4. separate handling of interruptible load and generation reserve;
5. removal of unnecessary maximum ramp rate requirements;
6. SoC constraints in scheduling and dispatch;
7. accounting for round trip losses;
8. interim arrangements that allow BESS owners to trade expected capability and revise trades after gate closure where capability changes;
9. the Authority's decision not to remove constrained off payments for BESS while charging at this stage;
10. accelerated work on shorter gate closure.

Aquila recommends the Authority make shorter gate closure a clear next stage reform with trials and decision gateways. BESS is fast, forecast sensitive and SoC sensitive. The greater the reliance on BESS to respond to peak and renewable variability, the less defensible it becomes to require BESS to make binding positions on stale information.

Responses to consultation questions

Q1. Do you agree with the proposal to require BESSs to be dispatchable while consuming?

Yes. A BESS should be dispatchable when charging as well as discharging. Charging is an active power system action, not passive demand. Dispatchability while consuming will improve system coordination, reduce physically infeasible outcomes and allow BESS to respond efficiently when the system needs load reduction, energy injection or reserve capability.

This reform is also aligned with Draft SOSA 2026. During tight winter periods and low renewable output, it will matter whether BESS charging can be reduced or reversed in a coordinated way.

Q2. Do you have comments on the proposed Code drafting for issue 1?

Aquila supports the drafting direction but recommends checking that the drafting:

1. recognises a BESS as a single physical resource across charging and discharging states;
2. applies coherently to both grid connected and embedded utility scale BESS;
3. avoids duplicate or inconsistent dispatch instructions;
4. is consistent with SoC, reserve and gate closure provisions;
5. does not inadvertently capture auxiliary load in a way that creates disproportionate obligations.

Q3. Do you agree with separate offers and dispatch for interruptible load and generation reserve?

Yes. Aquila supports separate offers and dispatch for interruptible load and generation reserve. They are different services with different technical and operational characteristics. Separate treatment should reduce confusion and support clearer dispatch and settlement.

The Authority should still ensure the BESS owner can manage the combined physical limits of the battery, including SoC, inverter capacity, reserve enablement, minimum operating levels and any connection limit.

Q4. Do you agree with 10 price bands for bids and 10 price bands for offers?

Yes. Ten bid bands and ten offer bands provide reasonable granularity and align with the need for BESS to express different values for charging and discharging across operating conditions. Aquila supports this as a practical starting point.

The Authority should revisit price band adequacy once SoC constraints and any future five minute settlement pathway are further developed. Greater granularity may become valuable if BESS becomes a larger source of fast flexibility.

Q5. Do you agree that BESS owners should not be required to submit maximum up and down ramp rates?

Yes. BESS can ramp much faster than conventional generation, and fixed maximum ramp rate submissions may add complexity without improving dispatch accuracy. The better approach is to rely on technical capability information, telemetry, plant controls and dispatch systems that recognise BESS response characteristics.

If ramp rate information is ever required for a specific operational reason, it should be targeted and proportionate rather than a general obligation.

Q6. Do you agree with the proposal to address issue 2?

Yes. Aquila supports the proposed single bid and offer framework and associated changes. The current arrangements risk treating charging and discharging as separate resources even though the BESS is one physical asset.

Q7. Do you have comments on the proposed Code drafting for issue 2?

The drafting should make clear that a BESS can move between consumption and injection without being treated as two unrelated assets. It should also avoid creating settlement, reserve or dispatch outcomes that require simultaneous charging and discharging unless the plant is technically configured to manage internal flows that do not affect the grid connection point.

Q8. Should BESS owners be able to withhold energy if requested to do so in a grid emergency?

Yes, subject to clear limits and processes. If the System Operator requests that a BESS preserve energy for a grid emergency, the BESS owner should be able to withhold energy to comply with that request.

The Code should make clear:

1. who can issue the request;
2. how the request is communicated and recorded;
3. how long the request applies;
4. how the BESS owner's compliance is assessed;
5. how opportunity costs and any resulting constrained outcomes are treated;
6. how the request interacts with offer obligations and trading conduct obligations.

This is especially important if BESS is expected to support tight winter peaks or system emergencies.

Q9. Should BESS bid and offer arrangements be aligned?

Yes. Charging and discharging are two sides of the same physical resource. Aligned bid and offer arrangements should improve dispatch feasibility, reduce compliance complexity and support more efficient operation.

Q10. Is greater clarity needed around circumstances allowing trade revisions after gate closure?

Yes. Greater clarity is essential. BESS operation depends on SoC, renewable output, reserve enablement, connection constraints, network conditions, outages, ambient operating conditions and system instructions. These can change materially after gate closure.

Aquila recommends that the Code clearly distinguish legitimate capability based revisions from purely economic rebidding. Legitimate reasons should include changes to SoC, plant availability, connection or inverter limits, reserve commitments, System Operator instructions, network constraint changes, forecast renewable output, safety related deratings and material data errors.

Q11. Should dispatch schedule SoC constraints be based on half hour energy availability?

Aquila supports the proposed half hour basis as an interim design aligned with current settlement and forecast schedules. However, the Authority should not treat this as the enduring answer if five minute settlement or shorter gate closure proceeds.

BESS operates at sub half hour timeframes. SoC constraints based on half hour energy availability may be adequate for initial implementation, but the Authority should design systems so they can evolve toward five minute or rolling remaining period constraints where that produces more accurate dispatch.

Q12. Should SoC constraints account for round trip losses?

Yes. SoC constraints should account for round trip losses. Ignoring losses would overstate usable energy and could create infeasible dispatch schedules.

The loss assumptions should be asset specific where possible, auditable, and capable of reflecting charging and discharging losses, auxiliary load and degradation related changes where material.

Q13. Do the WITS manager and clearing manager require SoC constrained bid and offer information?

Yes. The WITS manager and clearing manager need access to appropriate capped or SoC constrained bid and offer quantities to perform their functions accurately. This is important for transparency, settlement and constrained off calculations.

The information requirements should be limited to what is necessary and should protect commercially sensitive information where possible.

Q14. Do you agree with making gate closure arrangements the same between operating states and connection types?

Yes, as an interim harmonisation measure. Consistent gate closure across operating states and connection types will reduce complexity.

However, Aquila strongly recommends that one hour gate closure not become the final design for BESS. Draft SOSA 2026 highlights risks that depend on fast changing conditions: wind output, winter peaks, gas and thermal availability, project delivery and demand growth. BESS needs fresher information to respond efficiently to those conditions. The Authority should accelerate shorter gate closure trials.

Q15. If gate closure is made one hour for embedded BESSs, is a legacy clause warranted?

A time limited legacy clause may be warranted for existing embedded BESS that would face material system, contractual or compliance costs from an immediate move to one hour gate closure. Any legacy arrangement should be narrow, transparent and time bound so it does not entrench inefficient differences between grid connected and embedded BESS.

Q16. Do you agree with the proposed incorporation of round trip losses in SoC constraints?

Yes, subject to using realistic asset specific assumptions. Round trip loss modelling should avoid a single generic value where better project specific data is available. It should also consider the interaction with reserve enablement and minimum SoC requirements.

Q17. Are there other factors to include in adjusted capacities and limits?

Yes. Adjusted capacities and limits should be capable of reflecting:

1. current SoC and minimum SoC limits;
2. connection limits;
3. inverter limits;
4. DC coupled hybrid constraints;
5. reserve enablement and headroom;
6. auxiliary load;
7. forced outages and partial deratings;
8. temperature or safety related limits;
9. network constraints and System Operator instructions;
10. forecast renewable output for hybrid assets;
11. commissioning, testing and compliance limits.

Q18. Are there other reasons why a BESS owner should be able or need to revise trades after gate closure?

Yes. Legitimate revision reasons should include objective changes in capability or system need after gate closure, including:

1. SoC changes due to dispatch or reserve events;
2. material changes in wind or solar forecasts for hybrid assets;
3. changes to network constraints;
4. System Operator instructions;
5. plant trips, deratings or return to service events;
6. safety related operating limits;
7. metering, telemetry or market system data errors;
8. emergency energy preservation requests.

The Code should not permit unrestricted price only rebidding after gate closure, but it should allow BESS to remain physically accurate and useful.

Q19. Do you agree with the proposal to address issue 3?

Yes. Aquila supports the longer term proposal to use SoC constraints and enable fuller capacity trading. This should reduce the need for BESS owners to self limit conservatively because of uncertainty about future SoC.

The Authority should make clear that this work is a foundation for more dynamic gate closure and settlement reforms.

Q20. Do you have comments on the proposed Code drafting to address issue 3?

The drafting should clearly identify:

1. the information the BESS owner must provide;
2. the information the System Operator will use;
3. how capped quantities are calculated and communicated;
4. how errors are corrected;
5. how confidentiality is maintained;
6. how SoC constraints interact with reserve and emergency instructions.

Q21. Are there other factors for adjusted capabilities under the interim proposal?

Yes. The interim proposal should include the same practical factors identified for adjusted capacities and limits: SoC, connection and inverter limits, reserve commitments, hybrid output, plant availability, network constraints, auxiliary load and System Operator instructions.

The interim design should be simple enough to implement quickly but should not be so narrow that it forces inaccurate trading positions.

Q22. Are there other reasons why a BESS owner should revise trades after gate closure under the interim proposal?

Yes. During the interim period, trade revisions should be allowed where expected capability changes for objective reasons. The examples in response to Q18 should apply.

Because the interim proposal will operate before full SoC constraints are implemented, clear guidance will be especially important to reduce compliance uncertainty.

Q23. Do you agree with the interim proposal to address issue 3?

Yes. Aquila supports the interim proposal because it can deliver benefits sooner than waiting for all software changes. The interim arrangement should be monitored closely and replaced by the full SoC constraint design as soon as practicable.

Q24. Do you have comments on the proposed Code drafting for the interim proposal?

The drafting should be practical and clear. It should not require BESS owners to prove capability changes to an unrealistic level of precision before revising trades. The test should be whether the owner had a reasonable, objective basis for the revision at the time.

The Authority should publish examples of permitted and non permitted revisions.

Q25. Do you agree with the decision not to propose removing constrained off payments for BESS while charging at this stage?

Yes. Aquila agrees with the Authority's decision not to remove constrained off payments for BESS while charging in this amendment.

Constrained off payment reform should be considered holistically, not as a narrow BESS only measure. Flexible resources may provide energy, reserve, congestion management, voltage support and other network or system benefits. Removing compensation in one operating state without considering the broader value stack could weaken efficient investment signals.

Q26. Does the proposed Code amendment accurately capture BESS owners' obligations in Parts 13, 14 and 15?

Broadly yes, but Aquila recommends further checking for unintended consequences in relation to:

1. embedded BESS;
2. BESS hybrid stations;
3. DC coupled assets;
4. auxiliary load and station service;
5. constrained off calculations;
6. reconciliation and metering obligations;
7. audit obligations for new data flows.

Q27. Do you agree with the objectives of the proposed amendment?

Yes. Aquila agrees with the objectives and recommends that the Authority expressly frame them around competition, reliable supply, efficient operation, system resilience and consumer affordability.

BESS reforms are not only about making a new asset class easier to trade. They are about enabling resources that can help manage winter peaks, renewable variability, fuel uncertainty and network constraints.

Q28. Do you agree the benefits outweigh the costs?

Yes, provided implementation is timely and proportionate. The benefits include improved dispatch feasibility, better competition, stronger BESS investment signals, more efficient use of renewable generation, and improved security and resilience.

Costs will arise from software, data, compliance and participant system changes. Those costs are justified if the Authority keeps the design focused and avoids unnecessary obligations.

Q29. Can you provide evidence or further information about benefits or costs?

The key evidence Aquila points to is:

1. Draft SOSA 2026, which identifies fragile margins and sensitivity to project delay, gas availability, demand growth and renewable output;
2. Transpower's grid connection update, showing a large and active generation and battery connection programme;
3. Transpower's recognition that batteries and demand side management may provide transmission alternatives or non transmission solutions;
4. the Electricity Authority's own battery performance analysis, which notes that New Zealand grid scale batteries are already providing energy and instantaneous reserve services;
5. the Australian NEM experience, where five minute settlement was implemented to align dispatch and settlement and improve price signals for fast response technologies.

The Authority should also quantify the avoided cost benefits of BESS in network constraints and security events, not only average energy arbitrage.

Q30. Is the proposed amendment preferable to other options?

Yes. The proposed amendment is preferable to leaving the current arrangements in place. The current framework risks physically infeasible dispatch and under use of BESS flexibility.

Aquila's preferred path is the proposed amendment plus accelerated work on shorter gate closure and a staged five minute settlement roadmap.

Q31. Does the proposed amendment comply with section 32(1) of the Act?

Yes. Aquila considers the proposed amendment is consistent with promoting competition, reliable supply and efficient operation for the long term benefit of consumers. It is necessary or desirable because existing arrangements were not designed for utility scale BESS as a single resource capable of both consumption and injection.

Q32. Do you have comments on the drafting of the proposed amendment?

Aquila recommends a final drafting review against the following principles:

1. technology neutrality where possible;
2. clear treatment of BESS as a single physical resource;
3. consistency across Parts 13, 14 and 15;
4. clear information obligations;
5. proportionate compliance and audit requirements;
6. workable treatment of embedded BESS;
7. no unintended barriers for BESS hybrid and DC coupled projects.

Requested Authority actions

Aquila recommends that the Authority:

1. proceed with the BESS Code amendment;
2. implement the interim capability based trade revision framework as soon as practicable;
3. publish a clear timetable for SoC constraint implementation;
4. accelerate shorter gate closure trials for BESS;
5. keep constrained off payment reform out of this narrow amendment;
6. assess BESS compensation and network support value holistically;
7. refresh the security of supply evidence against final SOSA 2026 before final decisions.