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To: The Electricity Authority
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Genesis supports the Authority prioritising Code changes to enable BESS

Genesis Energy Limited **(Genesis)** welcomes the opportunity to comment on the Electricity Authority's **(the Authority)** *Wholesale market arrangements for battery energy storage systems* Issues and options paper. Genesis agrees battery energy storage systems (BESS) will play an important role in unlocking flexibility and efficiency in New Zealand's electricity system. Construction is underway on our first 100 MW / 200 MWh BESS at Huntly with commercial operations on target for Q1 FY27. Genesis is also actively considering potential for an additional 400 MW BESS in the future.

We support the Authority's proposal to treat BESS as generators while charging and discharging, and its proposal to introduce a single bi-directional offer form for energy. These are sensible changes that will make it easier for BESS to participate in the wholesale market. However, in our view, state of charge constraints will only partially address the problem of conservative or under-utilisation of BESS relative to their potential. We therefore encourage the Authority to undertake further work with the System Operator on investigating reducing gate closure times. While we acknowledge shortening gate closure may increase scheduling complexity and uncertainty, it is our understanding that shorter gate closure periods have been adopted in other jurisdictions including the National Electricity Market in Australia and that this is necessary to enable the efficient operation of BESS and maximise system benefits that BESS can provide. We are also concerned that State of Charge constraints may impact incentives for BESS owners to make accurate offers and bids. That is, if BESS owners know the System Operator will impose SOC constraints, it may diminish incentives for them to calibrate offers and bids based on all available information.

Regarding the Authority's proposal to remove constrained off payments for BESS, we note this appears to be inconsistent with the proposal to require BESS to follow dispatch instructions when charging i.e. if BESS are required to follow dispatch instructions when charging, there is a case for allowing BESS to receive constrained-off payments as there is a potential opportunity cost from this occurring.

The Authority can go further and faster to maximise the flexibility benefits of BESS. BESS will play an increasingly important role in supporting the future electricity system of New Zealand. The increased share of wind and solar generation means that more short-term flexible technology (in addition to existing generation) is required. A progressively more pro-active effort is required by the Authority, System Operator and market to foster and support innovation and accommodate these new technologies in both the regulatory framework and electricity system.

We therefore strongly encourage the Authority to prioritise this work. Furthermore, we would welcome the opportunity for closer collaboration with the Authority and the System Operator on regulatory changes to enable BESS more broadly, for example via workshops with industry. Some examples of broader regulatory changes we would advocate the Authority and System Operator investigate further are as follows:

- **Enabling Ancillary services**: we agree with the Authority that BESS are well-suited to providing ancillary services. We therefore suggest the Authority progress work to remove any regulatory barriers to BESS providing additional ancillary services. For example, we understand the National Electricity Market in Australia allows BESS to provide fast-raise and -lower products. Frequency keeping is another ancillary service where Code changes may be required to better enable BESS participation.
- **Block dispatch:** The Authority should consider allowing BESS to block dispatch within gate closure to firm co-located intermittent generation. Enabling block and station dispatch would allow fuller utilisation of the operational flexibility of BESS.
- **5-minute settlement:** We agree implementing a 5-minute settlement period would be a significant undertaking for Authority, System Operator and the market, and would take time to implement. Accordingly, we strongly recommend the Authority prioritise work on this work. As intermittent renewables grow and provide an increasing percentage of New Zealand's electricity generation, shorter time resolution and shorter gate closure periods will remove current potential spot price inefficiencies and make it easier to balance supply and demand in real-time as BESS owners (or generators) can more accurately offer balancing resources. We note other jurisdictions already use 5-minute settlement, including in Australia's National Energy Market.
- **Reserves market**: changes to enable BESS to fully participate in the reserves market.
- **Forming of final prices from Real-Time Prices:** another possible improvement that could be made quickly would be to change the methodology in the Code to form volume weighted final prices from RTP. Both RTP price and volume datasets are published by the Authority and so the Authority has the volume data. It is a simple amendment to the calculation to give volume weighted final prices by GXP/GIP.
- **MDAG recommendations:** We note MDAG also made recommendations that could support utilisation of BESS to the benefit of the system. For example, MDAG's recommendation to implement an ahead market

(recommendation 27) could also help enable more efficient BESS participation.

Yours sincerely,

Mitchell Trezona-Lecomte
Senior Advisor – Government Relations and Regulatory Affairs

Consultation questions and Genesis' response

Questions	Comments
Understanding the characteristics, benefits and future operation of BESS	
Q1. Do you agree we have sufficiently identified the unique characteristics of BESS to assist in developing appropriate arrangements?	Yes, we agree. It is our view that the current Code does not allow for the full operational flexibility of BESSs to be exploited to the benefit of the system. We therefore support the Authority undertaking reform to ensure the rules accommodate BESS and allow for their highest value use.
Q2. Do you have any views on how BESSs should be defined in the Code?	We note the Authority's Regulatory Roadmap for BESS sets a plan for the Authority to review common quality requirements for BESS in Part 8 of the Code. As part of this, the Authority intends to consider the extent to which the definition of energy storage systems (ESSs) in the Code remains fit for purpose. We support the Authority doing this. While we do not have specific proposed wording for the Code definition of BESS, we recommend the Authority look at how BESS are defined in other comparable jurisdictions.
Q3. Do you agree that BESS can deliver the benefits described? Are there any other benefits that will assist us in assessing the size of benefits of different arrangements?	Yes, we agree. In addition to the benefits described, we also expect that BESS, by providing short-term flexibility, will support *further* growth of solar and wind generation.
Q4. Do you agree with our description of how BESSs are likely to operate and how this will change over time? If not, why?	BESS operation is subject to innovation and will change over time, as market conditions will change over time as well. Individual BESS operators in New Zealand may have specific operational considerations in support of their business case and cycle strategy. In general, merchant BESS will be optimised to generate maximum value and cycle accordingly (to capture price volatility). We are not sure what the basis is for the assumption by the Authority under section 3.32. In most jurisdictions, initial revenues from BESS were generated from provision of ancillary services, moving to wholesale markets when ancillary services markets become saturated. In the first wave, BESS were also configured as 1-hour systems, moving to 2-hour systems and now to 4-hour systems.
Q5. Do you have any other insights about potential BESS operation that will help with assessing the benefits of our options?	BESS can participate in both competitive markets (wholesale energy and ancillary) and delivery of regulated monopoly services (network services). One of the key potential public benefits of BESS (and additional flexibility generally) will be avoided or deferred network investment (total public benefits from flexibility estimated by Sapere at nearly $7 billion). To realise this benefit, it is critical that the market is efficient and transparent to incentivise investment in long-lived assets such as BESS. It will therefore be critical that, where BESS can deliver network support,

	procurement for these services is done in a way that is fair and transparent. This will be especially important given the Government has committed to removing the current restrictions on network owners also owning generation assets above 50 MW connect to their networks and above 250 MW connected to the grid. The purpose of these restrictions is to limit opportunities for network or grid owners to foreclose competition by exercising their monopoly power. Without these restrictions, it will be important for government to ensure other rules under Parts 6 and 6A and Part 4 of the Commerce Act are adequate and can be enforced.
Dispatch requirements for BESS when charging	
Q6. Do you agree with the way we have framed the issues?	Yes.
Q7. Do you agree with the Authority's preferred option? If not, what are alternative options that would better address the issues? Are there any particular risks with our preferred option that you would like to identify?	Yes, we support this.
Bids and offers forms for BESS	
Q8. Do you agree with how we have framed the issues?	Yes.
Q9. Do you agree with out preferred options? If not what other options would better address the issues identified?	Yes, we support this.
Q10. Do you think further restrictions to BESS participation in MFK under the current arrangements would have any effect on their participation?	No comment.
Balancing flexible trading with security needs	
Q11. Do you agree the issues identified by the Authority are worthy of attention? If so, do you agree with our framing?	We agree current gate closure rules under-utilise the flexibility of BESS, resulting in unnecessarily conservative bidding. Potential system benefits of BESS are therefore foregone. We note the Authority identifies potential for "gaming" as an important reason to not reduce gate closure. The fact the Authority regards monitoring of BESS as difficult, as noted in paragraph 6.75, is not a strong reason not to reduce gate closure but rather suggests the Authority may want to review its market monitoring regime as it applies to BESS. We are also unconvinced that the factors cited in the paper are genuine instances of improper trading.

	These opportunities sound more like the appropriate outcome of innovation i.e. early technology adopters, who bear risk from early adoption, are rewarded with advantages. Provided all asset types have the same gate closure (both grid-connected and embedded) then there is a level playing field and should not be an issue. Paragraph 6.73 suggests gaming opportunities would stem from BESS having power to set prices "compared with participants with longer gate closure periods". To clarify, we support exploring reduced gate closure periods for all generation types, not just for BESS.
Q12. Do you agree that BESS should have the same arrangements when charging and discharging, and that embedded BESS should have the same arrangements as grid connected BESS?	Yes, we support this.
Q13. Do you agree with our preferred new arrangements for BESS?	We are sceptical that state of charge constraints would be the best solution for addressing the problem. State of charge constraints and reduced gate closure are effectively addressing separate sets of issues.
Q14. Do you see any issues with how we have defined state of charge constraints?	We are concerned that SOC constraints would undermine incentives to make accurate offers or bids, as BESS owners would simply trade their full capability at gate closure knowing the System Operator will apply SOC constraints. There is therefore a risk SOC constraints dilute incentives on BESS owners to calibrate offers and bids based on all information available to them. This could lead to inefficient use of resources i.e. more or less stored energy could be used than is optimal, resulting from the fact that bids / offers by BESS owners are non-definitive (essentially guidelines) with the System Operator ultimately making dispatch decisions based on non-price factors.
Q15.Do you agree that the benefits of state of charge constraints likely outweigh the costs?	No comment.
Q16. Do you agree with how we have characterised the differences between various options?	No comment.
Q17. Are there any other options that you think would better achieve the gate closure objectives?	See our comments at the front of this submission. As noted above, we see merit in the Authority further considering potential for shorter gate closure times as part of broader Code changes to enable maximum BESS participation. Shorter gate closure times have potential to create system benefits, particularly as the system becomes more highly renewable, by allowing greater flexibility in BESS dispatch and improving the

	accuracy of forecasting inputs, and we note the Authority's own modelling shows a material impact on BESS revenues (albeit with conservative pricing). However, we accept shortening gate closure this would be a significant undertaking by the Authority and the System Operator. As noted, we also see 5-minute settlement as an option meriting further consideration. Higher time resolution for settlements, shorter gate closure times, combined with a day ahead market, would all significantly improve incentives for BESS to operate in the market. We therefore recommend the Authority prioritise further investigation of these options.
Q18. Do you consider an interim solution is necessary? If so, do you agree with the potential solution we suggested?	No comment.
Q19. Do you have any information that can help us better understand the benefits and costs of different options? This includes, for example, substantiating the system risks, and how to improve our modelling of benefits.	No comment.
Constrained off payments	
Q20. Do you agree the issues identified by the Authority are worthy of attention?	The issues identified are not a priority, and the focus should be on other priorities such as gate closure and ancillary service products that BESS can contribute to.
Q21. Do you agree with our framing of the issue?	See comments above and response to Q20.
Q22. Do you consider having constrained off payments would affect bidding and offering behaviour from BESS?	We think there is a risk removing constrained-off payments for BESS could impact incentives for BESS participation given BESS will also be required to follow dispatch instructions when charging (under the Authority's proposal in this paper).
Q23 Do you agree with our preferred solution?	See comments above and response to Q22.