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To: The Electricity Authority
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Genesis Energy submission on Common Quality and Wholesale Market Arrangements for BESSs and BESS-hybrid stations

Genesis Energy Limited **(Genesis)** welcomes the opportunity to comment on the Electricity Authority's **(the Authority)** *Common quality and wholesale market arrangements for BESSs and BESS-hybrid stations Issues and options consultation paper*. We applaud the Authority for prioritising this work to better enable BESS integration into the system. Please find below our responses to relevant consultation questions. While we do have yet have firm views on the options canvassed, we do support the paper's stated approach of taking an approach that reflects BESS-hybrid plant design and operations.

Yours sincerely,

Mitchell Trezona-Lecomte

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Common quality and wholesale market arrangements for BESSs and BESS-hybrid stations – Issues and options consultation paper

Section 3: Terminology

Questions	Comments
Q3.1. Do you support the proposed 5-level structure for generating asset definitions?	There may a case for treating AC-coupled and DC-coupled assets differently, further consideration should be given to anticipated differences in market participation.
Q3.2. Do you foresee any implementation issues or unintended consequences associated with the 5-level structure for generating asset definitions?	Hybrid units at the Generating unit level (Level 1) should be separated to clearly define the difference between AC-coupled and DC-coupled BESS or generation.
Q3.3. Do you have any feedback on the System Operator's recommendations in its *Hybrid Plant Integration* report?	For greater clarity, the term "BESS Hybrid Station" should be split out into "BESS as a consumer and generator" and " BESS included in a generating plant".

Section 4: Asset owner performance obligations for 'idle' BESSs and BESS-hybrid stations

Questions	Comments
Q4.1. Do you agree with how the Authority has defined the 'idle' operating state of a BESS and a BESS-hybrid station? Please give reasons if you do not agree.	Idle state operation may cause unnecessary cycling: • A +/-0.1 Hz deadband while idle could result in the BESS continuously short-cycling. • This may increase battery degradation and reduce asset life. While BESS can technically provide these services, doing so may adversely affect plant capability, degradation, and commercial availability. In principle, we suggest BESS should be treated the same as other plant. While we understand the benefits of more differentiated AOPOs for

	BESS based on operating state, as the Authority notes this may increase operational complexity and cost in the form of additional forecasting, modelling, telemetry and compliance cost. We encourage the Authority to consider whether the benefits from imposing idle-state AOPOs on BESS or BESS-hybrid stations (in the form if better frequency and voltage support) would outweigh the additional costs particularly the potential wear-related and operational costs to BESSs. The Authority may wish to consider as an alternative imposing frequency support while idle, but with a wider deadband.
Q4.2. Do you consider that frequency management obligations should apply to an idle BESS and an idle BESS-hybrid station? Please give reasons if you do not agree.	See our response to question 4.1, our starting point would be to suggest equal treatment for BESS to other plant types. Regarding Option 1A, we are unclear how this would work if a BESS owner's operating strategy relies on frequency regulation or black start. It is our understanding that under this option the BESS owner would only be charged if you are providing when called upon. However, it would be good to clarify this. Regarding Option 1B, we seek clarification as to how the option for no AOPOs would result in the loss of relatively low-cost frequency management and voltage support capability from inverter-based resources that are technically able to provide it while idle?
Q4.3. Do you consider that voltage support obligations should apply to an idle BESS and an idle BESS-hybrid station? Please give reasons if you do not agree.	See our response to question 4.1, our starting point would be to suggest equal treatment for BESS to other plant types. Regarding Option 1A: we seek clarity as to how this would work if your operating strategy is frequency regulation or black start ie would a BESS owner only would be charged when called on to provide this?

	Regarding Option 1C – the difference between AC and DC coupled should be clearly defined.
Q4.4. Do you foresee any implementation issues or unintended consequences that we have not discussed in this paper?	See comment above.
Q4.5. What do you consider to be the key benefits and costs associated with applying frequency- and voltage-related AOPOs to BESSs and BESS-hybrid stations in the 'idle' operating state? Please quantify these benefits and costs if possible.	No comment.

Section 5: Applying the AOPOs to BESS-hybrid stations

Questions	Comments
Q5.1. Which option for applying frequency AOPOs to BESS-hybrid stations that are in the injection or consumption operating state do you support? Please give reasons for your answer.	We support a solution that enables flexibility in hybrid plant design and operation. As noted in the paper, option 2A appears to provide this flexibility in BESS-hybrid station design and operation by allowing differentiated responses from the technology-specific components in a way that maximises efficient and minimises unnecessary BESS cycling. It also better reflects the operational characteristics and portfolio benefits of BESS-hybrid stations which we expect will typically be commissioned on the basis of their ability to operate as a hybrid-station. For example, the benefits of solar and wind generation are optimised in combination with BESS.
Q5.2. Do you consider there to be options for applying frequency AOPOs to BESS-hybrid stations in the injection or consumption operating state that are preferable to those identified by the Authority? Please give reasons for your answer.	No comment.

Q5.3. Do you foresee any implementation issues or unintended consequences associated with applying the frequency AOPOs to BESS-hybrid stations in the injection or consumption operating state that are not identified in this paper?	See our response to question 4.1.
Q5.4. What do you consider to be the key benefits and costs associated with the options for applying frequency AOPOs to BESS-hybrid stations that are in the injection or consumption operating state? Please quantify these benefits and costs if possible.	See our response to questions 4.1 and 5.1
Q5.5. Which option for applying the voltage support AOPO to BESS-hybrid stations that are in the injection or consumption operating state do you support? Please give reasons for your answer.	We support a solution that enables flexibility in hybrid plant design and operation. As noted in the paper, option 3A appears to provide this flexibility in BESS-hybrid station design and operation by allowing differentiated responses from the technology-specific components in a way that maximises efficient and minimises unnecessary BESS cycling. It also better reflects the operational characteristics and portfolio benefits of BESS-hybrid stations which we expect will typically be commissioned on the basis of their ability to operate as a hybrid-station.
Q5.6. Do you consider there to be options for applying the voltage support AOPO to BESS-hybrid stations in the injection or consumption operating state that are preferable to those identified by the Authority? Please give reasons for your answer.	No comment.
Q5.7. Do you foresee any implementation issues or unintended consequences associated with applying the voltage support AOPO to BESS-hybrid stations in the injection or consumption operating state that are not identified in this paper?	No comment.
Q5.8. What do you consider to be the key benefits and costs associated with the options for applying the voltage support	As above, under question 5.5

AOPO to BESS-hybrid stations that are in the injection or consumption operating state? Please quantify these benefits and costs if possible.	
Q5.9. Do you consider that clause 8.23 should be revised to move the point of compliance from the generating unit terminals to the point of connection to the transmission network (on the high voltage side of the connection transformer)? Please give reasons for your answer.	No comment.
Q5.10. Do you consider there to be an alternative that is preferrable to a reactive power export/import requirement of ±39.5% or ±33% of maximum continuous MW output power, measured at the generating station's point of connection to the transmission network (on the high voltage side of the connection transformer)? Please give reasons for your answer.	No comment.
Q5.11. Do you foresee any implementation issues or unintended consequences associated with moving the point of compliance under clause 8.23 from the generating unit terminals to the point of connection to the transmission network that are not identified in this paper?	No comment.
Q5.12. What do you consider to be the key benefits and costs associated with moving the point of compliance under clause 8.23 from the generating unit terminals to the point of connection to the transmission network? Please quantify these benefits and costs if possible.	No comment.
Q5.13. Do you consider that legacy arrangements would be needed for existing generation? Please give reasons for your answer.	No comment.

Section 6 questions: Wholesale arrangements for BESS-hybrid stations

Questions	Comments
Q6.1. Do you agree with the preferred option of requiring BESS-hybrid stations to offer by technology component except in certain circumstances, over the alternative option of creating new obligations for BESS-hybrid stations? If not, why not?	We support the Authority's decision to accelerate work on BESS-hybrid stations. As noted, a long-term objective should be enabling hybrid stations to operate as integrated assets where this reflects their physical operation. While technology-component offering may be an appropriate interim solution, we encourage the Authority to continue investigating station-level or block dispatch arrangements for hybrid assets. We are unclear on which of the options proposed would best enable this. We support the Authority's stated desire to ensure the Code is aligned to how BESS-hybrid stations are designed to be operated.
Q6.2. Do you agree with our characterisation of the benefits and costs with our preferred option? Are there any other aspects we should consider?	We consider there are likely to be material efficiency benefits from enabling flexible station-level dispatch and request further analysis of these benefits before the Authority settles on a long-term component-only framework. Another point we would raise is regarding potential metering costs. Metering requirements should reflect generator operations. From an operational perspective, AC-side metering should be the relevant metering point. Additional or more granular metering requirements may create unnecessary complexity and costs (and be subject to market availability), particularly for DC metering solutions. The Authority should carefully assess whether compliance and metering requirements could outweigh the benefits of component-level offering for some hybrid configurations.
Q6.3. Do you agree station dispatch arrangements should be extended to	Genesis supports dispatch arrangements that reflect how hybrid assets are likely to be

accommodate BESS-hybrid stations that are offered by technology component? What, if any, other issues do you see with the station dispatch arrangements that are in addition to those identified above?	operated in practice and maximises the flexibility benefits of co-located storage and generation.
Q6.4. Considering the options above, how should the System Operator manage network injection from a BESS-hybrid station where injection is limited by inverter capacity? What implications would this have on your processes or systems?	Consideration should be given to options which are practical to implement and operationalise. As presented, options 6A and 6B could confer simplicity in implementation and operationalisation (respectively), however insufficient details are provided on option 6C to assess its implications.
Q6.5. Do you agree with our preferred approach to calculating constrained costs for DC-coupled BESS-hybrid stations? Can you provide any insights about what metering arrangements would be required to enable this approach?	We note there are potential costs from option 7A. Under this option, DC-coupled BESS-hybrid station owners would need to invest in systems that enabled the creation of volume information for each technology component of the station. We question whether this would be net-beneficial – also see above our comments regarding the need to ensure Code requirements avoid imposing unnecessary costs, and regarding metering arrangements. Consideration should also be given to further market consultation to ascertain availability of DC metering solutions, as relevant, as well as practical implementation, particularly given the potential costs of implementing these.