Lightsource bp
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30 June 2026

Electricity Authority
By email to: OperationsConsult@ea.govt.nz

Re: Common quality and wholesale market arrangements for BESS and BESS-hybrids

Thank you for the opportunity to provide feedback on the Electricity Authority's ("EA") consultation paper, Common quality and wholesale market arrangements for BESS and BESS-hybrid stations. Please find our response to the formal consultation questionnaire appended to this response.

Lightsource bp is a global leader in the development and management of solar energy and BESS infrastructure, active across 19 markets (including Australia and New Zealand) and has successfully developed over 11.5 gigawatts of utility scale solar projects and 1.3 gigawatt hours of BESS capacity across the world. In 2022, Lightsource bp entered a 50/50 joint venture with Contact Energy to develop multiple solar farm projects in various locations across New Zealand, including the 168MWp Kowhai Park Solar Farm the 171Mwp Glorit Solar Farm, both of which are currently under construction.

Lightsource bp has been an active participant in the evolution of the trading arrangement and market rules for hybrid projects in Australia's National Electricity Market. We currently have two Solar PV hybrid projects under construction in Australia, the 585MWp and 49MW/562MWh Goulburn River Hybrid Solar Farm and the 380MWp and 281MW/843MWp Lower Wonga Hybrid Solar Farm. Through this experience, we have seen the operational and system benefits that hybrid projects can provide through the co-location of renewable generation and storage behind a single connection point.

We support the EA's proactive work to clarify the regulatory and market framework for utility-scale BESS and BESS-hybrid stations. In particular, we agree with the EA's preferred direction of enabling technology component-based offering and dispatch arrangements for BESS-hybrid stations. In our view, separate dispatch treatment for solar generation and BESS assets is likely to provide the greatest long-term operational flexibility and market efficiency for hybrid facilities.

However, given the pace at which hybrid projects are currently progressing in New Zealand, we believe there are two areas that warrant a priority focus.

1. Interim arrangements to facilitate imminent hybrid project investments

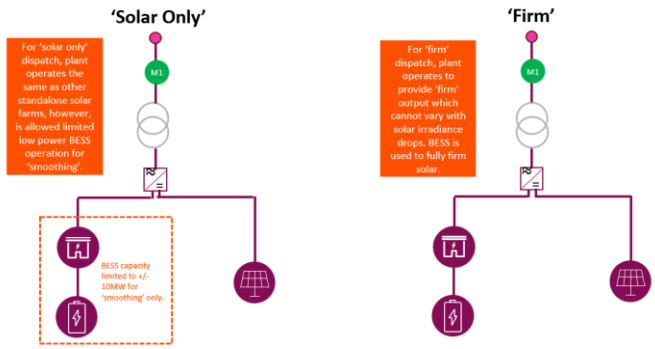
The Lightsource bp and Contact Energy JV is developing numerous Solar PV hybrid projects In New Zealand, the most advanced of which is the 190MWp and 150MW/440MWh Stratford Hybrid Solar Project. We expect to be in a position to make a Financial Investment Decision ("FID") and move this Project into construction by the end of 2026. However, to achieve FID we need sufficient certainty on the trading arrangements for hybrid projects that will be in place when the Project is expected to commence operations in late 2028.

As recognised by the EA, regulatory clarity for BESS-hybrid stations is important to reducing investment uncertainty and enabling timely development of new infrastructure. While we broadly support the longer-term market arrangements proposed in the consultation paper, we are concerned that the consultation, Code amendment, and implementation process may not conclude within the timeframe required for imminent hybrid investment decisions.

We therefore encourage the EA and System Operator to work closely alongside market participants to prioritise the development of pragmatic interim arrangements that can operate within the existing Code framework with limited system changes and implementation complexity.

In particular, we see merit in an interim "dual-mode" operational framework while longer-term market arrangements are developed. This approach is shown in Figure 1 below:

Figure 1: Dual Mode Operations



'Solar Only' Operation	'Fim' Operations
• Offer only solar availability (BESS essentially indicated as zero availability); • Function same as all current solar farms in market • BESS able to be utilised for 'smoothing' type functions if desired up to a maximum power of ± 10MW within current dispatch limit to facilitate greater compliance to dispatch (without obligation)	• Offers reflect plant intended capability by inferring proposed BESS capacity by station offers in excess of the provided solar availability or through offer of frequency keeping** • Station as a whole required to follow dispatch at all times in the same way as a Scheduled Bidirectional Unit' in the NEM ***If bidding parameters are not sufficient to determine which operation type is proposed ('solar only' or 'firm'), then consideration may be given to a flag to clarify the bid intent*

While this type of interim arrangement would provide less flexibility than the EA's preferred long-term framework, we believe it would materially reduce barriers to near-term hybrid investment and provide valuable operational experience ahead of enduring market reforms.

2. Flexibility for hybrid projects to elect to either; i) have each technology component treated as a standalone generating station, or ii) electing to pursue registration at a single 'station' level dispatch

Lightsource bp supports the EA's preferred option of requiring BESS-hybrid stations to offer by technology component in most circumstances. However, we do not believe project proponents should be precluded from electing to register and operate a hybrid facility at a single station-dispatch level where appropriate. Although a single-station approach may involve reduced operational flexibility and firmer dispatch obligations, it may still be preferable for some projects because it:

- Simplifies plant control system architecture and network modelling;
- Reduces the complexity associated with sub-metering and technology separation requirements; and
- Is unlikely to create materially different network impacts relative to separate component dispatch arrangements.

Lightsource bp appreciates the opportunity to contribute to this consultation process and would welcome further engagement wi th the EA as this work progresses. In particular, through the delivery of our hybrid projects currently under construction in the NEM, we are gaining substantial practical experience across the technical, operational, and trading arrangements for hybrid projects. We would welcome the opportunity to engage directly with the Electricity Authority to share insights and discuss any areas of interest in further detail.

Sincerely,

Nick Robb,
Country Head, New Zealand

Appendix: Consultation paper questionnaire

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

Submitter	Lightsource bp

Section 3: Terminology

Questions	Comments
Q3.1. Do you support the proposed 5-level structure for generating asset definitions?	Yes, we support the general structure concept. We note the following: • The 'Level 1' generating unit description describes an inverter with a single source of energy. It is important to recognise that for some dispatch metering considerations, it may be helpful to recognise that there may be an underlying 'resource' level associated with the particular fuel or DC source (eg. solar PV, BESS). The relationship between these fuel sources and inverter capability is required to be defined (see below). • The "Technology-specific component" may comprise of shared plant (e.g. inverter). Whilst it is conceptually separate from the "intermittent generating component" it will have shared infrastructure and hence operational relationships (e.g. inverter headroom). This is conceptually similar to a "coupled production unit" under the NER in Australia. It is not clear why Level 4 is required.
Q3.2. Do you foresee any implementation issues or unintended consequences associated with the 5-level structure for generating asset definitions?	Refer to Q3.1.

Q3.3. Do you have any feedback on the System Operator's recommendations in its *Hybrid Plant Integration* report?	To meet the definition of a BESS-Hybrid system, 3.24 (b) notes it shall be 'operationally significant'. There may benefit from having a defined MW threshold for behind-the-meter BESS on hybrid systems (e.g. 10MW) so as to facilitate small BESS where this is proposed primarily for smoothing purposes, without substantially complicating plant registration and dispatch requirements.

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.	Yes, provided that such definition contemplates the exclusion of auxiliary loads.
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.	No, we do not agree frequency and/or voltage control obligations should apply when the BESS is in an idle state. Such requirements create the following undesirable issues: • Requiring a BESS to provide such services may result in continuous discharge/charge which can lead to excessive battery cycling/degradation without any corresponding market revenue • Requiring such services is not consistent with the treatment of other technologies Based on the above, we would recommend that such services are only required when the BESS is operating (discharging or charging) or the BESS has been selected to provide Multiple Frequency Keeping (not Instantaneous Reserve). Similar considerations have been undertaken in the Australian market, which outcomes and findings can be viewed here: ERC0364 Clarifying MPFR for BDUs - final determination
Q4.3. Do you consider that voltage support obligations should apply to an idle BESS and	Refer to Q4.2.

an idle BESS-hybrid station? Please give reasons if you do not agree.	
Q4.4. Do you foresee any implementation issues or unintended consequences that we have not discussed in this paper?	Implementation needs to consider the specific meter and sub-metering points in a system and where dispatch compliance is assessed. We encourage the Electricity Authority to maintain a level of flexibility for the System Operator to apply discretion as to how dispatch compliance is monitored/metered, noting that there may be technical preferences for the actual control point of a plant PPC (e.g. the connection point) to be different to that of the point at which dispatch compliance is assessed for individual technologies (e.g. DC sub-meters).
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.	Refer to Q4.2 for the key concerns. Whilst we agree with the Electricity Authority's position that the proposed DC coupled separated 'generating units' basis is the optimal configuration, we do not believe that this should preclude proponents from being able register and trade a hybrid plant as a single 'hybrid generating station' with firm offers (i.e. no intermittent component). If electing this option, such plant should not be required to install metering or telemetry associated with any underlying technology or 'generating unit'. See response to Q5.1.

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.	The option supported depends on how the operator intends to operate the BESS-hybrid station. This means the code needs to allow flexibility to register plants for dispatch as either: • A 'BESS-Hybrid station' OR • By multiple components (with each generating unit having different AOPOs)

	For each of these options, the preferred frequency AOPO would at either the station level (Option 2A) or the component level (Option 2B) respectively. For all frequency keeping services, this should be assessed based on response of the underlying components where there are multiple components, or at the point of connection where separation of components is not proposed.
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.
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?	Consideration shall be given to individual performance levels required depending on the droop response achievable for each technology component.
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.	Component level compliance may reduce unnecessary cycling of BESS.
Q5.5. Which option for applying the voltage support AOPO to BESS-hybrid stations that are in the injection or consumption operating	Refer to Q5.1, but for voltage support AOPOs.

state do you support? Please give reasons for your answer.	
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.
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 AOPO to BESS-hybrid stations that are in the injection or consumption operating state? Please quantify these benefits and costs if possible.	No comment.
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	No, compliance to remain at the generating unit terminals. The primary reason is that the generating unit control is at the unit, not the PoC.

side of the connection transformer)? Please give reasons for your answer.	
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. Compliance to remain at LV terminals. The primary reason is it negates the need to factor in upstream system losses.
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?	Refer to Q5.9.
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	No comment.

generation? Please give reasons for your answer.	

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 agree that technology component level dispatch is the expected preferred solution, however we do not believe that this should preclude a proponent from electing to be able to only provide station level dispatch (and as such not be required to install associated DC metering and other telemetry). As an additional consideration, the proponents should be able to flag when aggregate dispatch at the station level is desired.
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?	Yes we agree.
Q6.3. Do you agree station dispatch arrangements should be extended to 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?	Yes, offering this would be helpful and would be considered similar to the aggregate dispatch in Australian market. This would assist when there are network constraints. We also would like to be able to register the system as a scheduled generator (bi-directional unit) – Similar to Australian NEM rules.

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?	An additional item to consider is how dispatch compliance is being assessed for BESS-hybrid stations. If compliance is assessed at a component level, the owner may be discouraged/disallowed to use DC clippings to charge the BESS unit when there is excess solar generation above the grid approved AC export limit. We recommend that the Electricity Authority specifically consider how charging from DC clipping losses is contemplated and treated, noting that this may fluctuate with a different relationship for inverter capability than in lower solar output scenarios.
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?	No comment.