

## Appendix C Format for submissions

Submitter	Rhys Foster
Q1. Do you agree the issue identified by the Authority is worthy of attention?	Yes.
Q2. Do you agree with the objectives of the proposed Code amendment? If not, why not?	<p>In principle, yes.</p> <ol style="list-style-type: none"> <li>1. Definitions should be expanded to include other forms of energy storage (e.g. flow-batteries, flywheels, compressed air, gravitational), and aggregators (demand response and/or energy storage).</li> <li>2. Distinctions such as “inverter interfaced” and the various categories of rotating machinery may be useful.</li> <li>3. Why the distinction between interruptible load and generating reserve? Up-reserve is the desired response, regardless of how it is delivered.</li> <li>4. Faster response should be incentivized. Most ESS systems (BESS in particular) will control their response to meet the minimum required (to minimize battery wear) unless the value of their faster response is rewarded. Further, most inverter interfaced ESS won’t provide useful inertial response.</li> <li>5. Given that curtailment of intermittent generation is often optimal for security of supply, such assets could also provide some level of IR (within forecasting errors).</li> </ol>
Q3. Do you agree the benefits of the proposed amendment outweigh its costs?	<p>Yes, with a few caveats:</p> <ol style="list-style-type: none"> <li>1. The assumption of “price-taker” behaviour should be tested. The proposed BESS project likely contemplates capturing some of the identified savings as revenue.</li> </ol> <p>Note: Not all BESS can quickly transition from charging to discharging.</p>
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.	<p>Yes.</p> <p>While the market and operational aspects may require further work, this revision should identify virtual power plants (aggregators) as a potential provider, including EV charging networks.</p>
Q5. Do you agree the Authority’s proposed amendment complies with section 32(1) of the Act?	

Q6. Do you have any comments on the drafting of the proposed Code amendment?	Remove battery everywhere (generalize to energy storage). Circular definitions of instantaneous reserve, generation reserve, PLSR, TWDR,
Clause (intro)	<b>battery energy storage system</b> means all equipment functioning together as a single entity that is both able to store <b>electricity</b> from a <b>network</b> and provide <b>injection</b>
	<b>generation reserve</b> means a reserved capability to increase injection of electrical power (MW)
	<b>interruptible load</b> means <b>demand</b> that is able to be reduced.
	<b>fast instantaneous reserve</b> means— a category of <b>instantaneous reserve</b> , meeting the qualification requirements defined in the procurement plan, that provides a response for at least the first 60 seconds after the start of a “Contingent Event” (as defined in the <b>policy statement</b> ).
	<b>sustained instantaneous reserve</b> means— a category of <b>instantaneous reserve</b> , meeting the qualification requirements defined in the procurement plan, that provides a response within the first 60 seconds after the start of a “Contingent Event” (as defined in the <b>policy statement</b> ) and that is sustained for at least 15 minutes ...
Q7. Do you have any comments on the drafting of the proposed procurement plan amendment? Clause X.X	Remove battery everywhere (generalize to energy storage).  Beware of perverse incentives in response definitions. For example, a battery system (or interruptible load) providing only SIR would likely wait 29 seconds before providing full contracted response (meets the “average over 60 seconds”). If the system corrects within the 60 seconds, the BESS has minimized the energy of its response.
B32.1.5.2.	responds with a droop set within the range 1.5 - 7 per cent or with a controlled response as agreed with the <b>system operator</b> <i>Note: BESS typically want a wide frequency deadband, due to the quantity of energy activity in this frequency range.</i>  <i>Different response curves provide different value to the system. Efforts should be made to define and capture these values. “As agreed” opens the door to manipulation and an unequal comparison of offers.</i>  <i>National Grid UK’s EFR development process (and now 3 years of operations) may provide some helpful insights.</i>