

*LCN Fund Full Submission*  
**Supplementary Answer Form**

Tick if this answer is Confidential:

Tick if this answer has been provided verbally:

Project code:	Smarter Network Storage	Question Number	UKPN001
Question date	30 August 2012	Answer date	04 September 2012
Submission section question relates to	Appendix G		
Topic	Cost Benefit Analysis		
Question	<p>Please explain the basis for the assumptions made in Appendix 5, section 1.1.5, regarding the proportions of the time for which the storage capacity is used for STOR, for frequency response and for specific DNO applications.</p>		
Notes on question			
Answer	<p>The energy storage facility will be installed adjacent to the Leighton Buzzard substation in order to mitigate thermal constraints of the overhead lines feeding the site which currently limit the available capacity in very high peak demand times. A secondary constraint which will be reached at the site in a number of years' time is the thermal rating of the transformers.</p> <p>In the preparation of this answer the following errata were identified. On page 5 of the submission document, Appendix G section 1.1.1, and the load demand curve presented on slide 6 to the Expert Panel, the overhead line rating should have read 35.6MVA. These errors occurred in our drafting of the text of the bid submission. This error had not been made in our underlying spreadsheets which analysed the proportion of time for which the storage facility would be required to support the local network.</p> <p>Initially our business case modelling has taken a very conservative position that the device would only be made available to third party market participants in timeslots of a whole day; and only when there was sufficient firm capacity to accommodate the maximum site demand expected to occur on that day at the same time as, and in parallel with, charging the device at</p>		

	<p>its maximum charge rate.</p> <p>The following assumptions or approximations were made in the development of the business case:</p> <ul style="list-style-type: none"> <li>• The analysis was based on two years worth of historic half-hourly data for the load on the 11kV side of the two 33/11kV transformers at Leighton Buzzard. The half-hourly data included a winter season with a higher maximum demand than the most recent winter, in order to act as a stress test.</li> <li>• A nominal line voltage / tap setting of 33 kV was used instead of carrying out a load flow for each half hour to determine the availability of the 33 kV network below Sundon Grid.</li> <li>• Our calculations of availability continue to make a traditional use of transfer capacity available at the substation, only ever using it to support times of customer peak demand. As such, we have not yet modelled a scenario in which, in the event of a fault on one of the overhead lines or one of the transformers occurring, that our control engineers begin to transfer demand to a neighbouring primary substation in order to ensure that we can continue to meet our contracted ancillary services.</li> <li>• A 1 MVA allowance for errors in forecasting daily demand and to allow for precision in voltage and current measurements was included.</li> <li>• Our calculations did not include the drop-off in availability that would logically occur as the site approaches the time for further reinforcement.</li> </ul> <p>Each day the maximum demand was determined and compared to the site firm capacity of 35.6MVA. If the difference was greater than the battery rating + 1MVA allowance for errors, then it was made available without operational constraint. This calculation implies that the services which the energy storage facilities provides on those days can be maintained even in the event of a fault on one of the overhead lines or one of the transformers. Over a two year period the average unconstrained availability was around 60%.</p> <p>Once we become more confident on the use, reliability and availability of the device the threshold for unconstrained availability may be relaxed.</p>
Attachments	
Verbal Clarifications (Consultants )	