

LCN Fund Full Submission
Supplementary Answer Form

Tick if this answer is Confidential:

Tick if this answer has been provided verbally:

Project code:	SNS	Question Number	UKPN035
Question date	02 October 2012	Answer date	04 October 2012
Submission section question relates to	Section 8		
Topic	Customer Impacts		
Question	<p>You have highlighted that there is an increased risk in unplanned interruptions due to fault outages. As required by the governance document, please indicate the potential number and duration of these unplanned interruptions.</p>		
Notes on question			
Answer	<p>In Section 8 of our submission we stated; "While such network installations inevitably increase the risk of customer interruptions due to the higher risk of fault outages, such risks will be minimised through normal safety and risk management procedures". This was intended to highlight the more general fact that installation of any new equipment on distribution networks carries a very small risk of customer interruptions.</p> <p>Since there is approximately 90MW of this particular battery storage technology previously deployed on networks internationally, including at smaller scale in the UK, we believe therefore this 'new technology' risk is minimal.</p> <p>Safety and operational-related learning has already been incorporated from previous small-scale projects, such as our Hemsby installation, and further information will be sought from other projects, such as CLNR, during the design phase of the project in order to further minimise the possibility of problems.</p> <p>The energy storage device is contained in a single controlled environment and has several layers of monitoring systems and safety features to detect faults and isolate them, as further described in our answer to UKPN027. The storage is connected with minimal additional circuit length via two dedicated circuit breakers, one at the 11kV busbar and one within the storage installation, which can remove the whole installation from the network. As a</p>		

	<p>consequence, any fault should not cause any unplanned interruptions, and the risk of unplanned interruptions is not increased as a result of general operation of the storage.</p> <p>Comparatively, the conventional reinforcement solution (Base Case) would involve a third transformer and long cable route which carries a significantly higher risk of outage from uncontrolled factors, including third-party damage and lightning (where cables are fed from overhead structures).</p> <p>It would require a series of low-probability events and failures in order for an unplanned interruption to occur. The probability of such a complex sequence of events is therefore extremely small.</p> <p>An example of the chain of events that would be required for an unplanned interruption to occur is illustrated below:</p> <ol style="list-style-type: none"> 1. A previous circuit or transformer is out of service due to a fault or planned maintenance; and 2. A fault within the storage installation (including power conversion system, batteries, transformers or auxiliaries) which results in high fault current; and 3. The battery management system fails to identify and disconnect the faulty component from the system as designed; and 4. The circuit breaker on the battery installation fails to operate as designed; and 5. The dedicated circuit breaker at the busbar fails to operate as designed; 6. Resulting in the incoming 33kV circuit breaker tripping to clear the fault, and disconnecting customers. <p>Should this unlikely series of failures occur, customers could be off supply in the worst case (assuming remote control switching was unavailable) until an engineer can attend site to manually disconnect the storage facility and restore supplies from the feeding circuit. The storage would not be reconnected to the network without investigating and understanding the cause of the failure of all of the protection systems, ensuring no risk of additional unplanned interruptions.</p> <p>In summary, the new technology risk associated with the installation is extremely low, and we believe carries a lower risk of interruptions to customers compared to the Base Case. Any interruption as a result of a chain of low-probability failures is extremely unlikely, and would only be of a duration required to either automatically or manually re-switch the network.</p>
Attachments	
Verbal Clarifications (Consultants)	

