

LCN Fund Full Submission
Supplementary Answer Form

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Project code:	Smarter Network Storage	Question Number	UKPN019
Question date	06 September 2012	Answer date	10 September 2012
Submission section question relates to	Appendix G		
Topic	Cost Benefit Analysis		
Question	Please explain the basis for the conclusion reached that over the period 2014/15 to 2039/40 the estimate of potential GB substations at which storage could be applicable rises from 260 to 671.		
Notes on question			
Answer	<p>The growth in sites across GB that would be suitable candidates for more flexible alternatives to conventional reinforcement was based upon an analysis of the current number of applicable sites across GB, and an estimate of the growth in applicable sites derived from the number of sites across UK Power Networks licence areas. The analysis is shown further in the attached spreadsheet.</p> <p>We used the assumptions described in Appendix G, Section 2 to first calculate an estimate of the growth in the number of applicable primary substations across UK Power Networks in 2010/11 and the number of applicable sites in 2014/15.</p> <p>This difference was calculated as follows:</p> <ol style="list-style-type: none">1. Based on the known site loadings and using the filtering steps which are described in Appendix G, Section 2, the number of sites estimated to be suitable for a flexible alternative to conventional reinforcement on UK Power Networks in 2010/11 was 51.2. Repeating this for 2014/15, and based on load growth forecasts for DPCR5, the number of sites estimated to be suitable for a flexible alternative to conventional reinforcement in 2014/15 was 87. <p>This implies 36 new UK Power Networks sites became suitable candidates for</p>		

	<p>flexible intervention over this 4 year period.</p> <p>3. Based on a figure of 802 active primary substations across UK Power Networks licence areas, this represents an increase of 4.5% over the four year period, or 1.1% annually.</p> <p>4. This was used as the basis for the annual rate of increase of all primary sites across GB that would be candidates for flexible alternatives to conventional reinforcement.</p> <p>This was applied to the approximate number of primary substations nationally (4800), to develop an estimate for the annual increase in sites each year from 2014/15 to 2039/40 for which a flexible alternative may be applicable. This is calculated as $4800 \times 1.1\% = 54$ sites.</p> <p>5. This figure was first subjected to the innovation adoption S-curve, described in Appendix G, Section 2, between 2015-2025 reflecting a gradual adoption from successful demonstration to business-as-usual, and served to arrest the initial rate of growth in applicable sites in this period. This is reflected in row 4 of the attached spreadsheet.</p> <p>These annual estimates were then also reduced by 50% to reflect the conservative assumption that demand side response (DSR) will also play a role in delivering flexible alternatives and so will be employed as an alternative to storage at half of all applicable sites. This is reflected in row 5 of the attached spreadsheet.</p> <p>The actual penetration of demand response compared to alternative flexible solutions is uncertain due to dependency on a range of factors such as customer-mix, adoption rates and certainty of responses achievable therefore in the interests of conservatism we assumed equal penetrations of storage and DSR.</p> <p>6. This annual increase in sites suitable for storage was then combined with the gradual growth of adoption at the initial 260 sites estimated to be applicable (also based on the innovation adoption S-curve, and reflected in row 3 of the spreadsheet).</p> <p>This total number of sites applicable is shown in row 6 of the attached storage. The growth in applicable sites as shown in the 'Net benefits' sheet of Appendix A, and further illustrated in Figure 4.1 (Page 28) of the Full Submission, is cumulatively then calculated as 671.</p> <p>For consistency with the project scale and trial site, only primary (EHV-HV and 132kV-HV) were considered, however in practice the ability to optimally size and relocate storage means it is likely to be applicable to a greater number of network locations at a range of different storage scales.</p>
Attachments	 Repeatability Analysis - (For Ofgem

Verbal Clarifications (Consultants)	
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