Supplementary Answer Form

Tick if this answer is Confidential: ☐

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Project code:	Smarter Network Storage	Question Number	UKPN020
Question date	6 September 2012	Answer date	10 September 2012
Submission section question relates to	Section 4		
Topic	Evaluation Criteria		
Question	Please provide a detailed explanation of the calculation of the cost savings estimate of £0.6bn to 2040 arising from the rollout of the SNS method across Great Britain.		
Notes on question			
Answer	An overall net benefit of circa £600m has been estimated of rolling-out the method for 2GW of electrical storage across Great Britain. In essence, this is achieved by subtracting the roll-out costs from the benefits obtained. The benefits have been obtained from Poyry's Zephyr model and work undertaken by Imperial College as has been detailed in the submission.

The costs and benefits have been modelled using the estimated profile of rollout as described in part 2 of Appendix G, which assumes 2GW of installed capacity by 2040.

Please note that this estimate of 2 GW of installed capacity is also well in line with the estimates in the Low Carbon Innovation Coordination Group's Technology Innovation Needs Assessment (TINA) for Electricity Networks and Storage of the potential up-take of sodium-based, redox flow and lithium-based batteries.

The details are shown diagrammatically in Figure 3 of appendix G. Details of the actual calculation based on present values is provide below:

Benefits:

£600m - Distribution network reinforcement savings of £500m - £600m were estimated from the level of annual system benefits from the | | |

deployment of storage calculated by Imperial College analysis[1]. The value of annual system benefits was taken as an average of the modelled results of the two price points nearest to that assumed in the Method costs. £600m of benefits has been assumed in the calculation. Note that this is commensurate and of the same order as our site-by-site business case, attributing a conservative <£1m saving per site across up to 671 installed sites.

(-£17m) – £15m to £17m of additional cost to the Transmission system is forecast in the same Imperial studies, based on the addition of distributed rather than 'bulk' capacity. Therefore a negative value £17m is included.

£630m   -   The present value benefits of provision of balancing services (Future Storage Value Streams) to the Transmission Services Operator is calculated as £630m. The methodology used is the same as that described in answer UKPN024, but for 2GW of storage capacity at the GB level.

£713m   -   These comprise system cost savings due to displacement of OCGTs on the system, reduced curtailment and better utilisation of plant, and associated reductions in carbon emissions due to reduced operating profiles in the presence of storage. The methodology is as described further in answer UKPN018, but for 2GW of storage capacity on the network.

(£530m is associated with displacement of OCGT's on the system, £170m is associated from the reduction in wind curtailment and better utilisation of remaining plant on the transmission system, and £13.1m is associated with CO_2 emissions savings)

Costs:

£1,320m - The present value cost of rolling out the method across the whole of the GB distribution system for a total 2GW of storage. This was calculated pro-rata based on our estimate of method costs once proven successful of c.£11.3m for a 6MW installation, applied to the estimated roll out profile.

Therefore it follows that benefits less costs gives:

(£600m + £630m +£713m – £17m) – £1,320m = £606m

i.e. Cost savings estimate to 2040 is £0.6bn

(1) Strategic Assessment of the Role and Value of Energy Storage Systems in the UK, June 2012, Strbac, Aunedi et. al.

Attachments	
Verbal Clarifications (Consultants)	