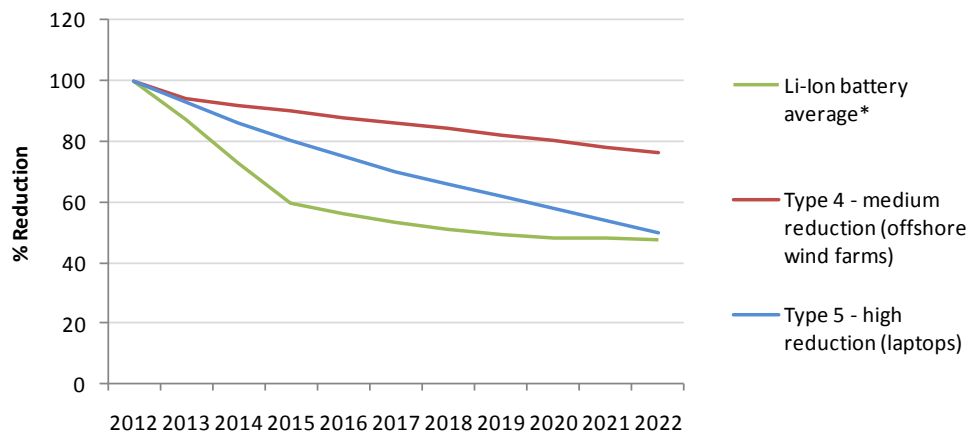## LCN Fund Full Submission
Supplementary Answer Form

Tick if this answer is Confidential: ☐

Tick if this answer has been provided verbally: ☐

Project code:	Smarter Network Storage	Question Number	UKPN025
Question date	20 September 2012	Answer date	24 September 2012
Submission section question relates to	Appendix G		
Topic	Cost Benefit Analysis		
Question	Please provide a breakdown of the cost savings that are assumed in deriving the once proven deployment cost of £11.3 million for the storage solution, including a detailed breakdown of the 'Innovation/1st of a kind costs' referred to in the business case.		
Notes on question			
Answer	Three core components were calculated to derive the 'once proven' deployment costs of storage of an equivalent size, as shown in Appendix A, Sheet 'Net Benefits', and further provided below: **a) Installed costs of the actual storage device, including housing, cells, power conversion system and all other auxiliary equipment.** A saving was assumed, reflecting the expected downwards pressure on storage technology as a result of increased deployment volumes and electric vehicle research investment. The total installed cost of a 6MW/15MWh storage device within the project (WS1 costs as shown in the full submission spreadsheet) total approximately £14m (excluding contingency). Various technology cost reduction curves were considered to estimate the projected cost of this aspect once proven successful. The range of curves considered is shown below, including those specific to Li-Ion technology. These predict a possible range of future costs in the range £6.6m - £10.6m by 2022.		

120
100
80
60
40
20
0

% Reduction

2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022

Li-Ion battery average*

Type 4 - medium reduction (offshore wind farms)

Type 5 - high reduction (laptops)

*Source: Bloomberg New Energy Finance, Lux Research, iSupply

We chose to take the conservative cost reduction curve, as used by EA Technology's recent work for WS3 of the Smart Grids Forum which provided the upper range installed cost of £10.6m for 6MW/15MWh of storage technology in the year 2022.

Although this represents a turnkey cost, incorporating project management, installation and civils costs; storage technology costs make up a significant proportion of this figure. For simplicity savings were applied to all these elements. This is realistic as savings could be expected across these additional areas due to increased experience and knowledge in the deployment of such assets.

b) Ongoing inspection, operational and maintenance costs.

A saving was assumed on those expected within the project, reflecting greater experience and learning generated by SNS and other projects relating to the asset management and operational methodologies of large-scale distribution-connected storage.

Within the once proven successful calculation, a cost of c.£50k per annum was assumed, covering £30k of spares and 30 days of maintenance per annum and 1 inspection visit monthly at approximately £400/day person cost. Over the same 10 year period as the income stream was calculated, this equated to a total discounted cost of £300k, reflecting the incorporation of storage assets into existing asset management regimes and reflecting typical.

Energy costs have been excluded from this aspect as the expectation once proven successful would be that these 'fuel' costs are covered by utilisation fees recovered through the optimal use of the storage when providing a range of services.

c) Ongoing IT and software costs to fully integrate and automate the optimisation and scheduling of storage.

A reduction in the operational IT costs of an optimisation and control system could be expected once proven successful and increased deployments and competition drive licence costs to levels in line with enterprise IT platforms

of similar complexity.

A cost of c.£60k per annum was assumed over the same 10 year period, giving a total discounted cost of £430k.

This currently assumes that new storage assets incurs equivalent new software and licensing costs, which may overestimate the cost due to likely savings and economies of scale when a single platform is used to manage multiple deployments across DNO areas, or across deployments managed by a single commercial third-party operator.

Total costs of replicating the solution once proven successful were therefore calculated as 10,600+300+430 = £11,300k.

Innovation / First-of-a-kind costs

In constructing the business case, the 'innovation / 1st of a kind costs' reflect the costs incurred in the SNS project that would not be expected to be repeated or required in future deployments of optimised, integrated storage.

These comprise the following which reflect the difference between the cost of a repeat deployment, once proven successful, not including any expected technology cost reduction:

Description	Cost (£k)
Initial Design and Development costs for the Smart Optimisation & Control system, which will then available for other DNOs to purchase at license fee cost only	2,741
Design, planning and execution of series of trials to prove multi-purpose operation, the income streams and results of which will be documented and disseminated	381
Design and development of contractual arrangements to underpin storage services, which will be made available as model contracts	239
Studies and modelling into the regulatory and market barriers, and value of storage, which will be disseminated	793
Costs of learning capture and dissemination, LCNF project management/delivery	2,263
Contingency	774
Total first of a kind cost	7,191

Attachments	
Verbal Clarifications (Consultants)	