UKPN037 – Appendix – Summary of Storage Installations

Installation / Location	Technology	Power / energy	Application	Cost	Cost/kWh	Comments
Smarter Network Storage - UK	Nanophosphate Li-Ion	6MW / 10 MWh	Network support and ancillary services	£12m	£1,200	Fully installed cost, including building costs, switchgear & auxiliaries
2.5MW/2.5MWh proposed device in CLNR, Northern Power Grid	Nanophosphate Li-Ion	2.5MW / 2.5 MWh	Network support	£4.6m	£1,840	Excluding MV switchgear & auxiliaries Includes economies of scale from multiple additional installations (project management, spares etc) Shipping container solution, therefore no building costs incorporated
Angamos, Chile, 2011	Lithium Ion	20 MW, 5 MWh	Local support for non grid connected power station	(Not published)	(Not published)	Operated by power station owner to improve cost efficiency of the whole system - storage owner is the generator owner, hence a whole system saving is achieved
Westover, Johnson City, NY USA, 2011	Lithium Ion	20 MW, 10 MWh (est.)	Frequency regulation	$17m	$1700	Cost understood to be in excess of $17 million as loan guarantee provided for this amount
West Berlin, 1987 - 1993	Lead acid	17 MW, 14 MWh	Frequency regulation	(Historical installation – n/a)	(Historical installation – n/a)	Berlin was dependent on CHP plant for much of its supply, and this was difficult to flex. Using a battery on the small island system was a lower cost way of providing frequency, than backing off CHP below maximum demand in order to provide flexible response.
Chino, California, USA, 1998 - 1994	Lead acid	10 MW, 40 MWh	Demonstrations including frequency damping on transmission lines	(Historical installation – n/a)	(Historical installation – n/a)	
Tehachapi, California	Lithium ion	8 MW, 32 MWh	Integration of wind energy on congested grid	$54 million, with $24 million ARRA grant	$1700	
Stephentown, New York	Flywheel	20 MW, 5 MWh	Frequency regulation for NYISO market	$53 million with $43 million loan guarantee	$10600	Equivalent sized system (operated by Beacon Power) in this market area generated revenue of c$1.58m last year As this is primarily a power device, cost comparison on kWh is less relevant
West Virginia, USA	Battery	32MW / 8MWh	Frequency regulation for PJM Market	(Not published)	(Not published)	Based on prices for frequency regulation in PJM's market, revenue would be c$130k/MW for last 12 months. Equates to c$4.17m for this installation from freq. regulation activities.