

Capital for Great Technologies Call: Grid-scale Energy Storage Panel

Panel Date: 19 June 2013	
Panel Members:	
Colechin, Dr Mike	Energy Technologies Institute (ETI)
Halliday, Dr Jim	Science & Technologies Facilities Council (STFC)
Alexandrou, Dr Yiannis	FEI Netherlands
Potter, Dr Robert	Johnson Matthey
Rhodes, Mr Matthew	Encraft
Watson, Professor Jeremy	Arup
Williams, Jacqui (Panel Convenor)	EPSRC

Click on a grant title to see further information about that grant.

Rank	Title	Equipment Account Reference	Principal Investigator	Equipment Account Holder	Lead Research Organisation	Partner Research Organisation	Awarded
1	Energy storage for low carbon grids	EP/J021199/1	Brandon, Professor Nigel	Bradley, Professor DDC	Imperial College London	Cardiff, Newcastle, UCL, Birmingham, Cambridge, Oxford, Sheffield, St Andrews	£14,283,000.00
2	Grid Connected Energy Storage Research Demonstrator	EP/J013714/1	Stone, Professor David	Jones, Professor R	University of Sheffield	Aston, Southampton	£4,869,420.00

Rank	Title	Equipment Account Reference	Principal Investigator	Equipment Account Holder	Lead Research Organisation	Partner Research Organisation	Awarded
3	Manchester-Liverpool Advanced Grid-Scale Energy Storage R&D Facilities	EP/J021229/1	Cotton, Professor Ian	Bailey, Professor CG	University of Manchester	Liverpool	£3,255,100.00
4	Centre for Cryogenic Energy Storage	EP/L017725/1	Williams, Professor Richard	Press, Professor MC	University of Birmingham	Hull	£5,914,440.00
5	ThermExS Lab: Thermal Exergy Storage Laboratory	EP/L018098/1	Eames, Professor Philip	Nimmo, Professor M	Loughborough University	Nottingham, Warwick	£1,700,000.00
Six applications were unsuccessful							
Total value applied for:							£54,180,919.00
Total value funded							£30,021,960.00
Success Rates (No. of grants)							45.5%
Success Rates (% of grant value)							55.4%

Capital for Great Technologies - Grid Scale Energy Storage

Imperial College London, Professor Nigel Brandon					
EPSRC Equipment Account Reference:	EP/J021199/1				
Title:	Energy storage for low carbon grids				
Principal Investigator:	Professor Nigel Brandon				
Lead Research Organisation:	Imperial College London				
Partner Research Organisations	Cardiff University	Newcastle University			
	University College London	University of Birmingham			
	University of Cambridge	Oxford University			
	University of Sheffield	University of St Andrews			
Department:	Electrical and Electronic Engineering				
Researcher Co-investigators:	None				
Other Investigators:	Prof Goran Strbac	Prof Tim Green			
	Prof Richard Green	Prof Janusz Bialek			
	Prof Phil Taylor	Prof Peter Hall			
	Prof Nick Jenkins	Dr Dan Rogers			
	Dr Michael Pollitt	Prof Peter Bruce FRS,FRSE			
	Prof Clare Grey, FRS	Prof Yulong Ding			
	Prof Patrick Grant FREng	Prof A.Kucernak			
	Prof G.Kelsall	Dr David Taborda			
	Dr J.Jeffers	Dr Stephen Skinner			
	Prof Z. Xiao Guo	Dr Paul Shearing			
	Dr Dan Brett	Dr David Howey			
	Dr Paul Fennell	Dr Neal Wade			
	Dr Paul D Mitcheson	Dr. Chris Dent			
	Dr. Sharon Ashbrook	Dr Philip Wormald			
Project Partners:	Electricity North West	E.ON New Build and Technology			
	Newcastle City Council	Northern Powergrid			
	Siemens	UK Power Networks			
Call:	Capital for Great Technologies - Grid-Scale Energy Storage				
Starts:	01 October 2012	Ends:	31 March 2015	Value:	£14,283,000.00
EPSRC Research Topic Classifications:	Energy Storage		Sustainable Energy Networks		
EPSRC Industrial Sector Classifications:	Energy				
Related Grants:	EP/K002252/1				

Imperial College London, Professor Nigel Brandon

Grant Summary

The capital investment in this proposal will establish a suite of materials processing and analytical facilities devoted to grid scale storage materials, coupled with manufacturing development, and linked to test beds for evaluating devices across a range of power levels. Linking these together through our proposed UK Centre for Grid Scale Storage, which will reach out to other key players in both academia and industry, the investment will enable the UK academic and industry research community to conduct far more innovative work, across a greater range of issues and scales, that is currently possible with the relatively limited base for grid scale storage related science and engineering. This capital equipment will sit at the centre of a network of other research programmes and activity, which provide the skilled researchers and students to utilise the equipment, but which do not fund equipment itself. The key factors limiting performance and lifetime of our selected storage technologies will be identified using the characterisation equipment, while materials processing from the nano-scale to the device scale, coupled with new design tools developed in other programmes, will allow us to develop new materials and devices that offer the lower cost, improved performance, and longer life needed for large scale grid applications. In addition, we will establish new facilities to scale up the fabrication of key energy storage components and devices to engineer cost-effective devices. And finally our test beds, designed to be complementary to existing industry facilities, and those that may be established by other academic teams, will allow both current, emerging and yet to be developed technologies to be tested and evaluated across a range of power and energy levels under

Organisation

Website:

<http://www.imperial.ac.uk>

University of Sheffield, Professor David Stone				
EPSRC Equipment Account Reference:	EP/J013714/1			
Title:	Grid Connected Energy Storage Research Demonstrator			
Principal Investigator:	Professor David Stone			
Lead Research Organisation:	The University of Sheffield			
Partner Research Organisations	Aston University	University of Southampton		
Department:	Electronic and Electrical Engineering, University of Sheffield			
Researcher Co-investigators:	None			
Other Investigators:	Dr Martin Foster	University of Sheffield		
	Dr Dan Gladwin	University of Sheffield		
	Dr Danielle Strickland	Aston University		
	Prof Jiabin Wang	University of Sheffield		
	Prof Peter Hall	University of Sheffield		
	Prof Qing-Chang Zong	University of Sheffield		
	Prof Andrew Cruden	University of Southampton		
Project Partners:	Western Power Distribution	G&P Batteries Ltd		
	Sterling Power Group	Altairnano		
	Portastor	ABB Power Conversion		
	Energy Cost Advisors Group			
Call:	Capital for Great Technologies - Grid-Scale Energy Storage			
Starts:	01 October 2013	Ends:	01 March 2015	Value: £4,869,419.86
EPSRC Research Topic Classifications:	Energy Storage			
EPSRC Industrial Sector Classifications:	Energy			
Related Grants:	EPSRC – Low Carbon Vehicles Call (EP/H050221/1) - ‘Ultra Battery Feasibility - Investigation into the combined battery-supercapacitor for hybrid electric vehicle (HEV) applications’			
Grant Summary				
<p>This consortium offers a unique opportunity to construct a novel full-scale 11kV grid connected energy storage based facility for academic and industrial research at a much higher voltage and power rating than is currently available, together with some specific satellite test facilities to meet small scale research requirements at 415V (for testing phase imbalance, voltage and frequency control for example). This full scale energy storage system is to be built on a design which incorporates all the knowledge from an experienced consortium of steering group members . The facility will comprise of a grid-connected 2MW battery storage system located at the WPD site at Willenhall, battery technology evaluation and novel</p>				

University of Sheffield, Professor David Stone

Aston for optimum use of second life batteries with COTS inverters, and vehicle-to-grid research at Southampton. In contrast to the usual small-scale laboratory level experiments performed to date, this facility will allow research to be conducted at a power levels commensurate with industrial installations thereby allowing the UK's power sector to observe the viability of energy storage for peak power buffering and grid stability/reinforcement provision at realistic levels and to assess both technical and economic potential of such systems. This vision will be realised by bringing together research capabilities in battery technologies, power systems operation, power electronics, and V2G expertise from some of the UK's leading academic institutions with a wealth of power infrastructure experience from the industrial partners.

Organisation

Website:

<https://www.sheffield.ac.uk/>

University of Manchester, Professor Ian Cotton				
Title:	Manchester-Liverpool Advanced Grid-Scale Energy Storage R&D Facilities			
Principal Investigator:	Professor Ian Cotton			
Lead Research Organisation:	University of Manchester			
Partner Research Organisations	University of Liverpool			
Department:	Electrical & Electronic Engineering			
Researcher Co-investigators:	None			
Other Investigators:	Andrew Forsyth	Ian Kinloch		
	Rebecca Todd	Peter Crossley		
	Vladimir Terzija	Laurence Hardwick		
	Richard Nichols	Heike Arnolds		
	Robert Dryfe	Gilberto Teobaldi		
	Chris Lucas	Vinod Dhanak		
Project Partners:	None			
Call:	Capital for Great Technologies - Grid-Scale Energy Storage			
Starts:	01 August 2013	Ends:	01 September 2014	Value: £3,255,100.00
EPSRC Research Topic Classifications:	Energy Storage			
EPSRC Industrial Sector Classifications:	Energy			
Related Grants:	None			
Grant Summary				
<p>This grant will support the Manchester-Liverpool consortium to create an interdisciplinary centre of energy storage research – with work ranging from fundamental electrode interface studies through to the integration of devices into power networks. The project will support the transformation of batteries and supercapacitors into a viable option for wide-scale adoption in utility and grid applications. To enable this revolution, an order of magnitude reduction in cost and an increase in cycle and calendar life from the current state-of-the-art devices found in consumer electronics, is required. Furthermore these improvements will then need to scale to sizes that have application in grid storage. This necessitates the close interaction of chemists, electrochemists, surface and material scientists, computational modellers, physicists and electronic and electrical engineers. The project will further develop the testing facilities at the Universities to create a world leading laboratory infrastructure that underpins a wide range of research on future high power energy storage devices and systems and which forms a focal point for cross-university collaboration on energy storage. The multi-scale testing facilities will ensure excellence in the fundamental understanding of electrode interfaces, progress in battery and supercapacitor cell development and the development of control electronics and algorithms that robustly ensure performance and durability in real-life environments through to the testing of systems at scale. These facilities will provide support to other UK researchers, developers and users of energy storage in both</p>				
Organisation Website:	http://www.manchester.ac.uk/energy/storage/			

University of Birmingham, Professor Richard Williams			
EPSRC Equipment Account Reference:	EP/L017725/1		
Title:	Centre for Cryogenic Energy Storage		
Principal Investigator:	Professor Richard Williams		
Lead Research Organisation:	University of Birmingham		
Partner Research Organisations	University of Hull		
Department:	Centre for Cryogenic Energy Storage		
Researcher Co-investigators:	None		
Other Investigators:	None		
Project Partners:	None		
Call:	Capital for Great Technologies - Grid-Scale Energy Storage		
Starts:	01 August 2013	Ends:	31 July 2014
		Value:	£5,914,440.00
EPSRC Research Topic Classifications:	Energy Storage		
EPSRC Industrial Sector Classifications:	Energy		
Related Grants:	None		
Grant Summary			
<p>This proposal is to bid for capital support for the creation of a Centre for Cryogenic Energy Storage at the University of Birmingham in collaboration with the University of Hull and a range of industrial partners. Such a Centre is essential for the accelerated development of a technology which can bring multiple energy system benefits and economic value to the UK. A pilot-plant has been shown to function as intended, but to be a viable technology for commercialisation, a research effort is needed to improve the efficiency of the system, to develop novel materials with lower costs and longer life-times, and to assess, model and simulate its dynamic performance characteristics as a grid-scale technology.</p> <p>Investment in equipment and a specialist dedicated lab facility at Birmingham would create an internationally-renowned centre keeping the UK at the leading edge of cryogenic energy storage (CES) R&D. The Centre's approach will cover the full CES system, from materials to devices / components and applications, and critically to key aspects of systems integration, control and optimisation. The work of the Centre will transfer directly to full-demonstration through partnerships with industry. Bringing this focus on a viable technology gives it the best opportunity for success.</p> <p>The University of Birmingham has grown an exceptionally strong research community around closely related topics with in excess of £20m research income across energy related areas over the last five years. The University is internationally renowned in the areas of hydrogen storage and applications, road and rail transport, and smart grid analysis drawing on the disciplines of materials science, metallurgy, mechanical engineering, chemical & process engineering, and electrical engineering. With the arrival of a new</p>			

Professor with an international reputation in energy storage, the University will build on its existing capability to deliver a world-leading CES centre which can pave the way for industry in the UK.

Organisation Website:	http://www.bham.ac.uk
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Loughborough University, Professor Philip Eames				
EPSRC Equipment Account Reference:	EP/L018098/1			
Title:	ThermExS Lab: Thermal Exergy Storage Laboratory			
Principal Investigator:	Professor Philip Eames			
Lead Research Organisation:	Loughborough University			
Partner Research Organisations	University of Nottingham		University of Warwick	
Department:	Electronic, Electrical & Systems Engineering			
Researcher Co-investigators:	None			
Other Investigators:	None			
Project Partners:	None			
Call:	Capital for Great Technologies - Grid-Scale Energy Storage			
Starts:	01 August 2013	Ends:	31 July 2014	Value: £1,700,000.00
EPSRC Research Topic Classifications:	Energy Storage			
EPSRC Industrial Sector Classifications:	Energy			
Related Grants:	None			
Grant Summary				
<p>This proposal requests capital infrastructure to create ThemExS Lab, a future centre of excellence for research on exergy storage involving high-grade heat. The proposal builds on the growing international consensus that heat capture, conversion and storage will become increasingly important in the move to a low carbon energy system and our analysis that it is likely to play a pivotal role in providing cost effective energy storage options both at the very large centralized and small distributed grid-scales.</p> <p>This revised version of the bid still covers the three categories in the original proposal, however to meet the reduction in funding to £1.7 million a significant reduction in the scale of the transition scale test platforms has been made. In addition, further discount arrangements are being negotiated with a number of suppliers, which has enabled greater value from the investment).</p> <p>The division of funds between categories is now:</p> <p>(A) Materials characterisation equipment for high grade heat storage materials (£0.536M) (B) Bench scale test platforms for examining heat transfer, fluid flow and storage density (£0.297M) (C) Transition scale test platforms giving insight into full scale system behaviours (£0.866M).</p>				
Organisation Website:	http://www.lboro.ac.uk			