

University research to develop technologies which could transform electricity system

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The University of Birmingham has won a £6m grant from the Engineering and Physical Sciences Research Council to create a new Centre for Cryogenic Energy Storage. The 'liquid air' technology could revolutionise the storage of energy, reducing the costs of integrating intermittent generation into the electricity system and ensuring power is available when it is most needed.

This funding is part of an investment of £85 million to support university research announced today (17 July 2013) by David Willetts, Minister for Universities and Science.

The new Centre, which will be housed on the University of Birmingham's campus, will be the UK's first dedicated research facility for energy storage using cryogenic liquids, comprising new laboratories, state of the art equipment, and a major demonstration plant.

Cryogenic energy storage systems use off-peak electricity to liquefy air. The cryogenic liquid that is formed is stored in a vessel then vapourised into a gas during an expansion process, which drives a turbine. This system generates electricity when it is most needed; taking off-peak electricity and using it at peak times will solve the 'wrong-time wrong-place' energy generation and supply problem. A grid-connected pilot plant has been operating in Slough since 2010.

Professor Richard Williams, Pro-Vice-Chancellor at the University of Birmingham and Head of the College of Engineering and Physical Sciences, and lead investigator on the project, said: *'The University of Birmingham has grown an internationally strong research community around energy related topics with in excess of £20 million research income across related areas over the last five years, so is well placed to host a centre focusing on the research and development of cryogenic energy storage.'*

He continued: *'Energy storage is the missing link in UK energy strategy and is critical to future UK domestic electrical energy supply and industrial needs. This award is for the groundbreaking technology of using cold liquefied air as a safe, cheap, large-scale energy warehouse. It will also provide the UK's first research demonstrator plant to enable development of applications for use in the city and region.'*

Toby Peters, co-founder of Highview Power Storage, developer of liquid air energy storage technology and industrial partner on the project, said: *'Liquid air is a perfect example of how British innovation can benefit society and the economy, with a partnership between the private sector and university. The use of liquid air could play a pivotal role in the low carbon future and also create a new industry for the UK worth at least £1 billion a year and more than 20,000 jobs.'*

He continued: *'We are delighted that the University of Birmingham will be building-up its capability in cryogenic energy storage. Our work to date has proven and demonstrated the core technologies. With this new dedicated research centre, we can now undertake the fundamental research to harness the opportunity and create a new industry to boost exports, technology transfer and high skilled jobs in this country in an environmentally sustainable way.'*

Cllr James McKay, Birmingham City Council Cabinet Member for a Green, Safe and Smart City, said: *'Issues of energy storage are going to be key to achieving the vision of the future laid out by Birmingham's Green Commission. We're thrilled to see this new national activity being developed in the city at the University of Birmingham and look forward working collaboratively together.'*

Minister for Universities and Science David Willetts said: *'For Britain to get ahead in the global race we have to back emerging technologies and ensure our universities have the latest equipment. This capital investment will help scientists make new discoveries and take their research through to commercial success. It will drive growth and support the Government's industrial strategy.'*

The University of Birmingham has also secured an additional £1 million of funding for research into high-temperature thermal energy management and systems. Materials which operate at the opposite end of the temperature range can play an important role in other energy storage technologies.

Professor Yulong Ding, a world expert in thermal energy storage, has recently been appointed to the prestigious Chamberlain Chair of Energy Storage Research at the University of Birmingham. He will take up position as Director of the new Centre in October 2013.

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Notes to editors

1. The University of Birmingham is part of the **Centre for Low Carbon Futures (CLCF)** (<http://www.lowcarbonfutures.org>), a collaborative membership organisation that focuses on sustainability for competitive advantage, formed by the University of Birmingham, University of Hull, University of Leeds, University of Sheffield and University of York. The CLCF energy storage programme covers technology development, demonstration activities, and policy/market analysis.

2. A report by Centre for Low Carbon Futures, **'Liquid Air in the energy and transport systems: Opportunities for industry and innovation in the UK'** (<http://www.liquidair.org.uk/full-report>), was launched at the Royal Academy of Engineering on 9th May 2013 following a six-month study. The report explored the technical, environmental and business potential of liquid air as a new energy vector. Contributors included Arup, Ricardo, Messer Group and academics from the Universities of Leeds, Birmingham, Strathclyde, Brighton, Queen Mary University of London and Imperial College.

3. The **Engineering and Physical Sciences Research Council (EPSRC)** (<http://www.epsrc.ac.uk>) is the UK's main agency for funding research in engineering and the physical sciences. EPSRC invests around £800 million a year in research and postgraduate training, to help the nation handle the next generation of technological change. The areas covered range from information technology to structural engineering, and mathematics to materials science. This research forms the basis for future economic development in the UK and improvements for everyone's health, lifestyle and culture. EPSRC works alongside other Research Councils with responsibility for other areas of research. The Research Councils work collectively on issues of common concern via Research Councils UK.

For further information

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