

carbon reduction helping companies meet targets

Efficiency in energy conversion and power generation:

Our economy is dependent on the effective conversion of different forms of primary energy into electrical energy. With the onset of radical carbon reduction targets, there is an urgent need to develop energy efficient devices and control strategies for energy conversion, drives and management to reduce the demand for energy. The University of Birmingham is home to cutting edge expertise and research facilities focused on achieving just this. The facility is funded by Advantage West Midlands (AWM) and European Regional Development Fund (ERDF) for Birmingham Science City.

The newly refurbished state-of-the-art laboratory has four sets of test facilities available for use:

- **Multi-purpose energy efficient pneumatic drive test rig.** The rig can be used to test dynamic performance, energy efficiency, and other mechatronic characteristics of pneumatic actuators when they are used as drives for motion control or for an air-electricity transformer. It also hosts an on-going research project in recycling exhaust energy
- **Hybrid renewable power generation test system.** The system serves as a flexible test bed for research in renewable power generation in hybrid connection with energy storage systems. A research project in hybrid wind turbine systems is currently on-going
- **Real-time control development system.** The system can be used for prototyping new optimal control strategies through hardware-in-loop simulations
- **Modelling and simulation of power plants.** Models of large scale power plants will enable low carbon technologies to be evaluated and new control strategies developed for optimisation

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The Power and Control Systems Research Group (PCSR) of the University of Birmingham is led by Dr Jihong Wang. The research areas of the group include: modelling, condition monitoring and control of power systems; energy efficient systems and actuators; applications of power electronics and clean power generation; and nonlinear control theory and industrial applications. The test facilities will be used to develop energy efficient actuators for compressed air energy storage systems. These devices could be deployed for a variety of applications including combined heat and power plants, fuel cells and engines.

The research group works closely with many industrial and academic partners, including E.ON Engineering, EDF Energy, Emerson Process Management, Energetix Group Plc, Jaguar Cars and Airtricity. The group is keen to develop new partnerships, particularly with local businesses from the West Midlands region.

The set up of this new facility is part of the £10.5m Energy Efficiency & Demand project, funded by AWM and ERDF under the Birmingham Science City initiative. It is a key part of a larger investment in the research infrastructure of the West Midlands region, which unites the Universities of Warwick and Birmingham in a newly-formed Science City Research Alliance (SCRA).

The Energy Efficiency and Demand project, led by the University of Warwick, sits alongside the Hydrogen project, led by the University of Birmingham, under the umbrella of the Energy Futures theme. The investment aims to develop and promote a regional hub for academic and industrial expertise in energy efficiency and demand reduction as part of the Government's mission to achieve a strong knowledge-based economy.

For further information and business enquires, including proposals for collaboration or access to the facilities:

Dr Mike Ahearne, Business Engagement Manager for the Birmingham Science City Energy Efficiency & Demand project.
Email: m.ahearne@warwick.ac.uk
Tel: +44 (0)24 7657 5484
Mobile: +44 (0)7824 541173

www.eece.bham.ac.uk



Dr. Jihong Wang – Head of Power and Control Systems Research Group (PCSR)

www.birminghamsciencecity.co.uk

General enquiries:
Sarah Keay-Bright
Project Manager
Research Support Services
University of Warwick
CV4 7AL

Email: s.keay-bright@warwick.ac.uk
Tel: +44 (0) 247 657 5492
Mobile: +44 (0) 7824 541135