

EPSRC Centre for Doctoral Training Energy Resilience and the Built Environment (ERBE): Information for Potential Partners

Background

UCL Energy Institute and the School of Architecture, Building and Civil Engineering at Loughborough University are developing a proposal to deliver high quality doctoral training and research at the interface of the energy and buildings sectors. Our bid aims to secure funding for an eight-year period, to train 50 students, building on our highly successful LoLo Centre for Doctoral Training in Energy Demand.

Our vision is to train innovative leaders with the expertise, multidisciplinary and workplace skills to transform the relationship between buildings and their energy systems, to increase flexibility and resilience, reduce demand and provide low carbon, affordable, healthy and productive places to live and work.

This document provides a brief summary of our research partnership offering, the benefits we offer to our partner organisations and how you can work with us.

Research focus

The proposed Energy Resilience and the Built Environment CDT addresses the national priority research area set by our funding body, the Engineering and Physical Sciences Research Council (EPSRC), of Energy Resilience through Security, Integration, Demand Management and Decarbonisation. The ERBE CDT will focus on the interactions between energy supply systems and buildings, and the need to create healthy and productive home and work environments. Research training will be structured under three themes:

- **Flexibility and resilience:** the interaction between buildings and the whole supply system, through new generation and storage technology, enabled by smart control systems, and new business models.
- **Technology and system performance:** demand reduction and decarbonisation of the built environment through design, construction methods, technological innovation, monitoring and regulation.
- **Comfort, health and well-being:** buildings and energy systems that create productive work environment and affordable, clean, safe homes.



The CDT programme will train students to become world class researchers, with the workplace skills to support their careers and the needs of the organisations they work for. Our students will have firm foundations in STEM subjects, combined with awareness of the wider, social, economic, political and personal factors that shape, enable and constrain technological solutions.

Benefits of our research partnerships

Research carried out in the ERBE CDT will be predominantly applied, with an emphasis on addressing challenges relevant to the sector's leading organisations. To ensure this we will co-create the training programme and research projects with you and provide graduates with skills relevant to your needs.

Benefits to partners include the opportunity to shape research projects of real technical & commercial significance with students spending up to three months on a placement at your organisation; opportunity to develop new research collaborations & strengthen current partnerships; access to world-leading expertise in energy demand in buildings research within and beyond the scope of PhD projects; access to graduates with excellent academic and professional track records who are committed to solving real world research problems; and potential to reduce your Corporation Tax bill through [R&D tax relief](#).

Supporting ERBE is an exceptionally cost-effective way to support and benefit from cutting-edge research.

Our Training Programme

The programme is designed to broaden students’ horizons and empower and support them in developing and conducting research in the energy demand area. It will provide students with a solid grounding in energy systems, building physics and performance, energy demand management and smart technologies, measurement and modelling, data analytics, economics and policy, and research concepts and methods. These taught courses will be integrated into the first 6 months of study, building on our highly successful MRes Energy Demand Studies programme, and reinforced through ongoing training across the four year programme.

Students will start to develop their PhD research topics as soon as they join us. Projects will be aligned to our themes and to the interests of our partners. Academic supervisors will be drawn from a pool of over 50 staff at Loughborough and London, who are at the forefront of their fields. PhD topics supported through the LoLo CDT since 2009 include:

Flexibility and resilience	Technology and systems performance	Comfort and wellbeing
Using behavioural science to increase consumer adoption of time-of-use electricity tariffs.	The impacts of project scale, scope and risk allocation on financial returns for clients and contractors in Energy Performance Contracts.	A socio-technical perspective on ventilation practices in UK social housing.
How does perceived personal control affect consumers’ acceptance of residential demand side management programmes?	Error & uncertainty in whole house heat loss (co-heating) measurement.	Mapping thermal discomfort responses in homes.
Modelling of integrated community energy systems.	Comparisons of the next generation of domestic heating solutions for real world conditions.	Building design optimization for whole year thermal comfort and indoor air quality in UK dwellings including occupant behaviour.
Aggregated load profiles of domestic buildings: the implications of an all-electric future.	Design and control of mixed-mode cooling and ventilation in low-energy residential buildings.	Ventilation and thermal comfort in UK homes: maintaining indoor air quality and reducing the threat of future air-conditioning of UK homes.
People, energy and zonal control applications.	Design and performance of natural ventilation in non-domestic Passivhaus buildings.	The benefits of reduced exposure to indoor & outdoor sources of air pollutants in deprived communities.
Blockchain-enabled peer-to-peer energy flexibility trading.		

Non-academic partnerships are essential

The ERBE CDT will only be able to undertake the research that the sector needs with the strong support of organisations outside of academia; we are in direct competition for applicants and funding with centres in topics ranging from engineering to quantum physics.

All new CDTs must show that at least 20% of student funding comes from sources beyond EPSRC. We therefore seek letters of support, evidencing contributions to training, research opportunities and financial support from outside academia.

These must include commitments to sponsor one or more students, at an annual cost of £7,500 over the four-year programme (£6,250 each for two or more students). Support of this type can be offered for any of our annual student intakes between September 2019 and 2023. We will provide you with assistance in drafting letters of support.



What to do next?

To find out more about the exciting partnership opportunities presented by the proposed Centre for Doctoral Training in Energy Resilience and the Built Environment, please contact us:

At UCL: Prof Bob Lowe, Centre Director (robert.lowe@ucl.ac.uk), Dr Cliff Elwell, Deputy Director (clifford.elwell@ucl.ac.uk) or Elinor Kruse, Partnerships Manager (020 3108 9044, elinor.kruse@ucl.ac.uk).

At Loughborough: Prof Kevin Lomas, Centre Director (k.j.lomas@lboro.ac.uk, 01509 222615) or Dr Arash Beizaee, Academic Manager, (a.beizaee@lboro.ac.uk, 01509 228788).