



## PHD RESEARCH OPPORTUNITIES UCD Energy Institute

The UCD Energy Institute, led by Professor Mark O'Malley, builds on the reputation of UCD as a leading centre for energy research, in particular UCD's Electricity Research Centre supported by leading energy companies. The Electricity Research Centre ([www.ucd.ie/erc](http://www.ucd.ie/erc)) is a unique collaboration between academia and major players in the electricity industry to tackle fundamental and applied research questions underpinning the development of a sustainable electrical energy system. Mark O'Malley, Professor of Electrical Engineering at UCD, is Director of the ERC, having founded the Centre in 1991 and grown it to a team of more than 80 people today.

The electric power and energy system is undergoing a period of dramatic and profound transformation with increased penetration of variable renewable generation resources at HV-grid/locally-distributed level, and greater activation of flexible demand side resources on the consumer side. In tandem with this, the electrification of other energy vectors (in particular heat energy demand) is seen as a likely pathway to de-carbonisation and ensuring security of supply for energy systems of the future. Such trends are creating numerous interdisciplinary and applied research questions in the area of '*Energy Systems Integration*', whereby electricity systems and flexible thermal electric demands are co-optimised across multiple energy and ancillary service markets, and across all timeframes to provide mutual techno-economic benefits. Innovative policy changes and market design will be required to allow realisation of such benefits in practice, as will advances in ICT to connect local domestic devices to overall grid control. These issues are particularly pressing in Ireland, given the technical nature of our electricity system, and ultra-high renewable electricity penetration targets over the coming years.

The Energy Institute at UCD is delighted to announce several upcoming opportunities for PhD level research in this exciting area, with related application to Smart Electric Thermal Storage, impacting across wide-ranging topics such as:

- Electric power and integrated energy system optimisation and control
- Demand-side management and aggregation of energy end-use applications (e.g., buildings)
- Integrated Energy system reliability analysis
- Electricity markets and policy
- Smart-appliance test-bed monitoring and data analysis

This research work will be carried out with strong collaborative links to major power and energy system and ICT industry players on the local and international scene. The modelling research will be supported by direct access to demonstration programs whereby smart electric thermal heating technology will be installed in more than 1000 homes in Ireland and across Europe. Research models and recommendations will thus be calibrated and benchmarked against real data and experiences gathered from the field. The applied nature of the research is envisaged to further strengthen UCD/industry research links, facilitate maximum societal research impact, and also allow further career development and training for research students. Expected research findings and outputs will be published in leading international peer-reviewed power and energy conferences and journals.

Ideal candidates for these positions will be highly motivated, numerate students with an excellent academic track record, proficient English and willingness to work in a dynamic and interdisciplinary research environment. The projects will entail significant engagement with internal and external research/industry stakeholders, so good communication skills are essential.

Exceptional applicants across all disciplines and levels of experience will be considered for the positions. Some background/interest in the following areas would be desirable:

- Electrical/Electronic Engineering
- Mechanical Engineering
- Applied Mathematics or Optimisation
- Economics of Energy Systems
- Computer Science / Data Analytics

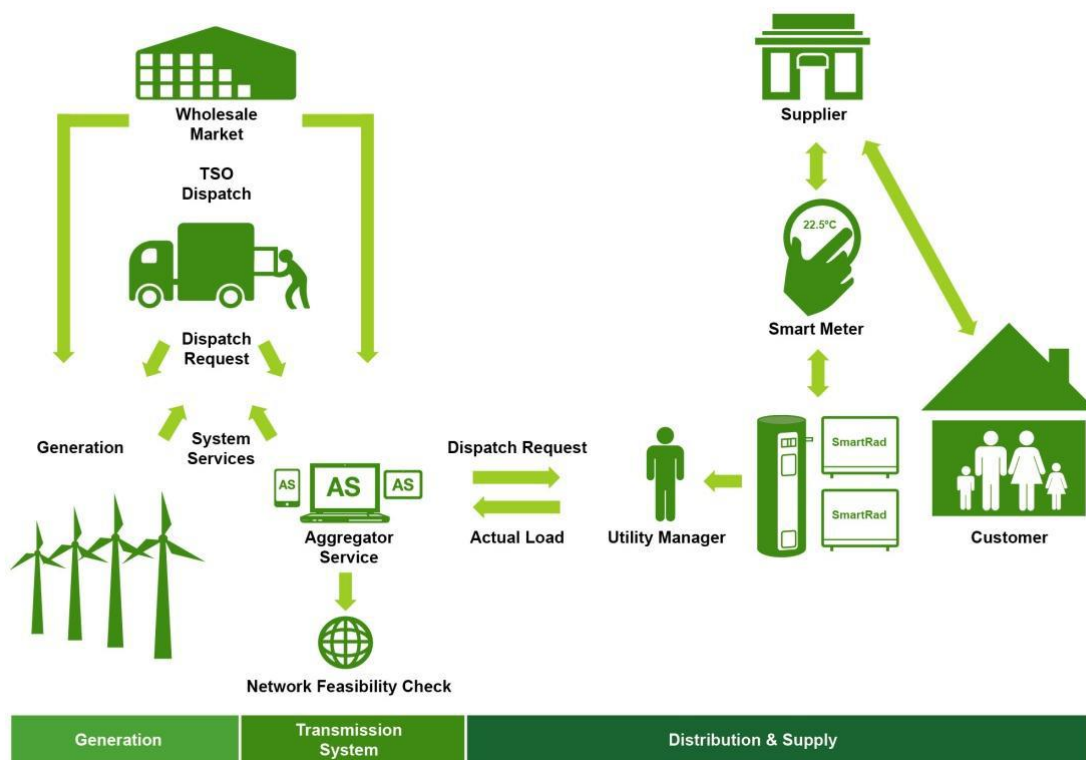
The positions would suit relevant graduates, and students in their final year of study are also encouraged to apply, as are candidates with industry experience.

We currently have five PhD student positions starting from June 2015 onwards, which would be provided with a living stipend of €18,000 pa (tax free) plus academic fees paid plus travel and consumable allowance for related expenditure. The positions are expected to be up to 4 years in duration. To be considered for one of these positions, please send an application by **30<sup>th</sup> April 2015**. CVs received after this date may be considered for future opportunities.

The application should consist of a CV, with fully documented academic record (modules and grades), and a cover letter of interest, emailed to:

Dr Daniel Burke, ERC Senior Research Fellow – [daniel.burke@ucd.ie](mailto:daniel.burke@ucd.ie)

or Dr Donal Finn, UCD Senior Lecturer Mechanical Engineering – [donal.finn@ucd.ie](mailto:donal.finn@ucd.ie)



*Smart Electric Thermal Devices and the Energy Systems Integration*