

**Engineering Doctorate (EngD) Research Opportunity**

Collaboration between the University of Reading and National Grid Electricity Transmission PLC

# Project Title: “Developing advanced visualisation techniques for Renewable Energy Model utilisation”

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*Based within National Grid Market Operation at their office near Reading and at the TSBE Centre, University of Reading*

**Closing Date for Applications: 17 October 2014 at 12 noon.**

The changing energy mix in the UK, in particular the effect of renewable energy as an energy source, faces certain challenges that need to be addressed to ensure its positive contribution; a particular challenge is understanding the uncertainty within the data that is used to predict the renewable energy output (e.g. in supply energy forecasts to the Control Room to assist in decision making). Currently the UK's National Electricity transmission system operator, National Grid plc. rely upon complex, data intensive production models to predict short term demand. Interpretation of variability within the output of these models using advanced visualisation techniques will therefore improve and simplify decision making.

The major academic contribution of this project is expected to come from developing advanced and novel techniques to assist in the visualisation of uncertainty and variability that arises from utilising meteorological data. These techniques will have a direct impact on the decision making processes with a complex and challenging real time environment. You will be developing novel visualisation presentations and prototyping them from within National Grid Market Operation. The project will draw most strongly on techniques in computer simulation and visualisation, to include both 2D and 3D immersive projection techniques and displays. The research method development will also be informed by an appropriate understanding of both technical aspects of renewable energy sources and their contribution in the overall balancing of energy sources and the economic impact of choices to be made during real-time operation. In addition, the student will need to have or develop a detailed understanding of atmospheric predictability and the production of meteorological forecast information in order to inform an appropriate design for the visualisation.

The research will be co-supervised by Prof. Paul Sharkey, Professor of Cybernetics within the School of Systems Engineering and Dr Andrew Charlton-Perez within the Department of Meteorology, School of Mathematical and Physical Sciences. Professor Sharkey's expertise spans the fields of robotics, control systems, active vision and virtual reality. He is the Director of the Visualisation and Interactive Technologies Centre, and a member of the Cybernetics Research Group. Dr Charlton-Perez specialises in the field of atmospheric dynamics and predictability and also has interests in how weather forecasts are visualized and communicated to end users.

We are seeking self-motivated, pro-active and ambitious applicants with a background and strong interest in one or more of the following areas: visualisation techniques; 2D/3D graphics; mathematical modelling; and meteorological modelling. Applicants must possess a good relevant degree (2:1 or higher) or MSc. The successful applicant will be developed as a good communicator and will be driven to conduct academically rigorous commercial research from within the UK's largest utility business.

The Application will be expect to split their time between National Grid and the University of Reading. Previous EngD students have gone onto developed a successful further career with National Grid, but participating in this research does not guarantee a position with National Grid.

#### **4 year Package**

- Stipend of £20,000 p.a
- All tuition fees are included
- Expenses package included
- EngD awarded by the University of Reading

#### **Eligibility**

Please note there are eligibility requirements, for more details refer to the EPSRC web site <http://www.epsrc.ac.uk/skills/students/help/Pages/eligibility.aspx>

#### **Further details**

Academic supervisor: Professor Paul Sharkey (School of Systems Engineering) Further information on the TSBE Centre can be found at: <http://www.reading.ac.uk/tsbe>

#### **Applications**

Applications should be made online through our website at: <http://www.reading.ac.uk/Study/apply/pg-applicationform.aspx>

Vacancy Reference No: P36-2013

Interviews will be held in October for a proposed start date in January 2015.