

# Grid-friendly connection of renewable energy



Energy generated from renewable sources is becoming increasingly important as the UK reduces its use of fossil fuels but this type of energy often goes into the grid via a common device called an inverter. These devices correct the voltage and frequency of the energy going into the grid and help in its regulation, but adding large numbers of them can have damaging effects on the power system. Dr Qing-Chang Zhong at The University of Liverpool has developed a grid-friendly solution for connecting energy from renewable sources to the national grid as part of his Royal Academy of Engineering and Leverhulme Trust Senior Research Fellowship programme.

**D**r Zhong and his collaborator Professor George Weiss at Tel Aviv University have developed a way to make inverters mimic grid-friendly synchronous generators, which are used by power stations to control peaks and troughs in energy demand.

The new technology is a software programme, called 'synchronverter', which mathematically models synchronous generators and can be easily installed into inverters without changing the existing hardware.

The main purpose of synchronverter technology is to make renewable energy grid-friendly but it may also be used to improve the performance of static synchronous compensators (STATCOMs) and uninterruptible power supplies (UPS). Synchronverter technology would remove the need for external communications between parallel-connected units, ultimately making them more reliable.

Synchronverter technology could also be implemented in the charging systems of electrical vehicles, making charging stations an essential part of future smart grids and a critical support system to the main grid.

Dr Zhong will be moving in October to Loughborough University to take up a Chair in Control Engineering.

The Royal Academy of Engineering and Leverhulme Trust Senior Research Fellowships enable mid-career academic engineers who want to focus on research to be relieved of their teaching duties for up to 12 months. Details of this scheme can be found on

The Academy's website [www.raeng.org.uk](http://www.raeng.org.uk) or from the Scheme Manager, Misty Palmer ([misty.palmer@raeng.org.uk](mailto:misty.palmer@raeng.org.uk)).

*For further information please contact Dr Qing-Chang Zhong, The Royal Academy of Engineering and Leverhulme Trust Senior Research Fellow, The University of Liverpool ([Q.Zhong@liverpool.ac.uk](mailto:Q.Zhong@liverpool.ac.uk)).*



*The wind turbine donated by Nheolis, France, being used to demonstrate the technology*