

# CLEAN Energy Solution for Farming Communities

## 2013 Cummins Environment Challenge Winning Project

**In January this year, the Cummins Generator Technologies Power Electronics team won the 2013 Cummins Environmental Challenge for the development of an integrated micro grid as an environmentally friendly solution for consumers who do not have access to electricity grids. The integrated micro grid they designed, supplies electricity using a combination of renewable sources and energy efficient generator sets to reduce carbon footprint and energy related expenses.**



*Power Electronics Team*

The development started early in 2013, when a local farmer made contact with Cummins Generator Technologies in Stamford, seeking their expertise for powering a pig farm. His intention was to fertilise his land using the nutrients recycled by pigs fed from discarded crops from the main farm. To establish the process his pig enclosures would need heating and light, but his farm was 1.5km from the nearest source of grid power. The cost of extending the grid purely for the farm's use was prohibitively costly, so a micro grid solution was chosen to provide living conditions for the pigs.

With the support of Cummins Generator Technologies leadership team, the Stamford engineers applied their collective design expertise and personal time to develop a solution that delivered the project at minimal cost, using spare parts from other power generation projects.

The system comprises of:

- Variable Speed Generator, enabling lower exhaust emissions and fuel consumption
- Solar panels, with a total power of 2.2kW
- A 1kW wind turbine, featuring remote monitoring.

The system is managed using integrated power electronics and battery storage.

When compared to a conventional generator set, the integrated micro grid operation provides:

- Operational cost savings of £3250/year
- Tariff Savings of £0.016/kWh
- Annual diesel fuel savings of 1440 litres, equivalent to 3.93tonnes of CO<sub>2</sub> emissions

Over 20 Cummins employees from Stamford, Kent, Fridley and Shoreview volunteered a total of 500 hours.

**A total of 6 students from Cummins Generator Technologies' community partners, the University of Nottingham and Stamford High School, were involved in this project, providing additional educational benefits as well as helping to promote awareness of distributed energy generation.**

The micro grid concept has a huge potential for any application where consumers are unable to access the grid, be that for a pig farm, or for power and light to a remote village. About 1.5 billion people worldwide are without access to electricity grids. At least 30 million households can be served profitably with micro grid energy solutions.

The project illustrated a winning combination of environmental impact, employee engagement, technological innovation, sustainability and community partnership. Thereafter, announced as one of the winners of 2013 Environment Challenge which was contested for by employees from 22 countries working within Cummins.

A \$10,000 prize was awarded for the winning Environmental Challenge and this is being used to sponsor a similar project at the University of St. Thomas in USA, and to provide a donation to Mary Parnham's Lenton Charity organisation in the UK.