

## **Reversed Fairford Soft Starts provide effective synchronisation in Central American Wind Farm Projects**



**Fairford QFE soft starters are providing a very effective, low cost and reliable solution for synchronising the operation of wind turbines to distribution networks - smoothly without harmful inrush currents and mechanical damage, in several major wind farm projects in Costa Rica, Panama and Nicaragua.**

Working in conjunction with Spanish partner, Descarrollos Eolicos, Fairford has supplied hundreds of its QFE soft starters, control cards and keypads for use in wind energy projects that are designed to reduce reliance of fossil fuels and achieve reductions in the greenhouse gases that cause global warming.

In the largest of these projects, at Tejona in Costa Rica, studies reveal that the CO<sub>2</sub> emission reduction will be of 30,000 metric tons a year, which will eventually represent an economic benefit for the project with the sale of carbon credits and a definite benefit for the environment

The function of the QFE soft starters in these projects is to bring the wind turbine generators on-line smoothly, achieving synchronisation to the power network without massive inrush currents on the

supply, and without the harsh shocks that can damage and break mechanical equipment such as bearings, couplings and gears.

The wind generator is driven to just below synchronous speed (approx. 93%) under the action of its aerodynamic rotor. At this point the QFE soft starter unit – working in reverse mode - is used to put the generator on line. The soft starter ramps the generator voltage up to the system voltage, and as the generator accelerates further to synchronous speed, a by-pass contactor is closed by the wind turbine controller (WTC) once it has received a top of ramp signal from the soft starter unit.

When the by-pass connector is closed, the wind turbine's power factor capacitors are connected and the turbine rotor then accelerates the generator up to a greater than synchronous speed, allowing generation to begin.

The QFE Soft Starter units that perform this operation are Fairford Electronics standard 690V range. They are designed to reduce the magnetic inrush currents, which are an order of ten times rated line current when starting the generator direct on line, to about one times rated line current. This current is held as an acceleration current during progression from 93% to full synchronous speed and, finally, freewheeling current. This is load current not drawn by the generator while it is at synchronous speed. It is handled by the QFE controller until the by-pass connector is switched in.

“The success of our QFE units in what is a very difficult application and a very demanding environment highlights both the flexibility and the reliability of our basic soft starter technology,” said Mark Shepherd, Fairford's Managing Director. “We have also demonstrated the relevance of soft starters to a new emerging method of power generation, proving that so called “mature technology” can still provide answers even in today's fast developing markets.”