Renewable Energy

Background

Renewable energy companies have experienced strong growth, but face pressure to improve profitability and productivity as the industry scales. Effective use of intelligent, but easy to use optimisation and process control tools is therefore essential.

Spiro MPC

Spiro MPC is a multivariable model predictive control application. The application comes embedded on a small footprint edge device, designed to connect to any control system easily. When embedded with Spiro MPC, the edge device is able to automate control of connected assets and can maintain processes at their optimal operating point.

Example: Spiro MPC applied to wind power generation farm

To achieve maximum combined wind power generation, a global wind power farm control solution needs to account for the complex interactions between wind turbines. In a wind turbine power generation farm, the output wind flow rate of each wind turbine decreases with increasing generated power. It affects the input wind flow rate of the downstream wind turbines, and then their dynamics. In this way, these wind turbines interact with each other.

Spiro Control's solution for achieving optimal control consists of controlling each wind turbine with an individual edge device with embedded Spiro MPC. Each edge device (controller) is connected and aware of wind turbine interactions so that all edge devices (controllers) in the network cooperate to ensure that a global objective is achieved. A solution consisting of distributed edge devices that cooperate holds many advantages over a centralised control solution. The benefits lie in how the solution facilitates deployments that are 'plug & play', secure, scalable, reliable, continuously available and exhibit the characteristics of easy serviceability, easily programmable and high agility.

Spiro Analytics

Spiro Control offers a range of analytics applications that come ready installed on a small footprint edge device designed to connect to any control system easily and capture real-time plant data. Our data analytics applications can be used to analyse process performance, diagnose faults and to infer hidden properties without the need for expensive on-line analysers.

Analysing sensor data collected from wind turbines in real time provides the data to train a regression model that can predict power output with a high degree of accuracy.

Most wind farms are located in remote areas where there may be network bandwidth and reliability issues. An edge intelligence solution can provide the advantage of being able to analyse data locally in real-time without relying on continuous network availability.

For more information, contact info@spirocontrol.com